Can deficits in empathy after head injury be improved by compassionate imagery?

AND CLINICAL RESEARCH PORTFOLIO

Volume 1

(Volume 2 bound separately)

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Faculty of Medicine Graduate School

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CHAPTER ONE: SYSTEMATIC LITERATURE REVIEW

Effectiveness of interventions for executive impairments of problem-solving and reasoning following acquired brain injury.

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Abstract:

Objective: Deficits in problem-solving and reasoning are common following acquired brain injury (ABI) and can cause significant social handicap and impede independent functioning. There is a lack of up-to-date guidance regarding the efficacy of interventions specifically targeted at these difficulties. The present study systematically reviews the evidence for the effectiveness of interventions for executive impairments in problem-solving and reasoning following ABI. *Method:* Ten databases were systematically searched in addition to hand searches of references lists and specified journals. 11 studies were identified: 9 problem-solving studies, and 2 reasoning studies. These were rated according to methodological criteria and effect sizes were calculated. *Results:* Of the 11 studies, two were rated as high quality. There is considerable support for the efficacy of interventions for executive impairments in problem-solving following ABI. Interventions for deficits in reasoning are less well-established; however one paper using a well-controlled design showed promising results and effect sizes were large. *Conclusions:* This review provides evidence of the effectiveness of interventions for deficits in problem-solving and reasoning following ABI. Future research should focus on more rigorously controlled studies targeting specific deficits in executive impairments in problem-solving and reasoning.

Introduction

Problem-solving is a complex cognitive skill that requires modulation of a number of underlying cognitive processes. Fundamental to problem-solving is the ability to adopt a mental set, integrate cognitive skills, plan, initiate, and evaluate outcome (McCarthy & Warrington, 1990). Problem-solving involves progressing through a series of logical stages: defining the problem, generating possible solutions, and evaluation (Bourne, Dominowski & Loftus, 1979). Whilst often conceptualised as a global ability, problem-solving involves a variety of specific cognitive processes for effective functioning. These include attention, working memory, and motivation (Evans, 2001). Reasoning is considered to be a vital component of problem-solving and relates to the ability to abstract meaning and follow a sequence of steps to a conclusion (Rath, Simon, Langenbahn, Sherr & Diller, 2003). Problem-solving and reasoning are part of the executive functions. The executive functions enable individuals to efficiently and effectively engage in complex goal-directed behaviour. These higher-order skills include cognitive processes such as planning, organisation, self-monitoring, initiation, problem-solving and error correction (Evans, 2009). The frontal lobes are instrumental to these processes (Burgess, 2003).

Disorders of executive functioning are common after acquired brain injury (ABI). In particular, problem-solving and reasoning abilities are often compromised. Impairments in problem-solving can cause significant social handicap and impede independent functioning (Evans, 2001). When presented with a problem, people with ABI often respond in a disorganised manner, fail to initiate tasks, show limited cognitive flexibility and an inability to learn from errors (Luria, 1966). Their methods of problem-solving are typically unsystematic and involve impulsive action (Sohlberg & Mateer, 1989); however it is often on real-life tasks that the magnitude of difficulties in problem-solving and reasoning are revealed (Goel, Grafman, Tajik, Gana & Danto, 1997). Difficulties in performing everyday tasks such as shopping, preparing meals, and keeping appointments can prevent individuals from leading productive independent lives. Studies examining the relationship between ABI and the resulting deficits are numerous however high calibre research focusing on interventions for these difficulties is limited (Kennedy et al., 2008).

Cicerone et al. (2000) conducted a systematic review of the effectiveness of cognitive rehabilitation following traumatic brain injury (TBI) and stroke. They identified fourteen studies of executive functions (including problem-solving). Only three of the studies were classified as a randomised control trial or non-randomised cohort study with the majority being single-case designs. Based on the results of the studies in their review, Cicerone et al. (2000) recommended formal problem-solving training and its application to everyday activities as a practice guideline for people with TBI. In 2005, Cicerone et al. published an updated systematic review of the literature from 1998 to 2002. They found nine additional studies that were aimed at improving executive functions following TBI and maintained their earlier recommendations. By their definition, 'executive function' encompassed studies focusing on self-awareness, behavioural inhibition, self-monitoring, and goal-management. This broad categorisation did not allow for more detailed analyses of the key components of successful interventions for problem-solving or reasoning. Rohling, Faust, Beverly, and Demakis (2009) conducted a meta-analysis of Cicerone et al.'s systematic reviews (2000; 2005). They found a small but significant effect size for cognitive rehabilitation. A large effect size was found for the experimental group pre-test to post-test outcomes, however a modest improvement was also observed in the control groups. The effect of treatment depended on age, time since injury, type of brain injury, and cognitive domain treated. Only four of the papers reviewed focused on rehabilitation for executive function and therefore this category was combined with studies on attention. The review did not report specific executive function findings. The review found that comprehensive treatments (not domain specific) failed to produce a significant effect. Based on the results of the meta-analysis, Rohling et al. (2009) recommended interventions targeted towards specific cognitive functions. Kennedy et al. (2008) systematically reviewed the literature up until 2004 on interventions for executive functions following TBI. They identified fifteen studies; eight were classed as randomised control trials or non-randomised cohort studies, of which three related specifically to problem-solving. On the basis of their review, Kennedy et al. (2008) recommended the use of metacognitive strategy instruction (MSI) to ameliorate difficulties in problem-solving, planning and organisation following TBI. MSI uses direct instruction and step-by-step procedures to facilitate problem-solving and encourage strategic thinking. The results of these reviews lend some support to cognitive interventions following ABI however these have been focused on the broader category of executive function and none have focused

specifically on problem-solving or reasoning abilities. There is a lack of up-to-date guidance regarding the efficacy of interventions specifically targeted at these difficulties. In order to fully evaluate the effectiveness of interventions for problem-solving and reasoning it is important that a review specific to these cognitive functions is conducted. This will enable a more thorough examination of the critical components and modes of delivery of such interventions.

The aim of this systematic review is to determine if there are effective interventions for executive impairments in problem-solving or reasoning abilities following ABI.

Research Questions

1. Are there effective interventions for executive impairments in problem-solving following ABI?
2. Are there effective interventions for executive impairments in reasoning following ABI?

Method

Search Strategy

An electronic search of the following databases was conducted: All Evidence Based Medical Reviews (Cochrane Database of Systematic Reviews, ACP Journal Club, Database of Abstracts of Reviews of Effects, Cochrane Central Register of Controlled Trials, Cochrane Methodology Register, Health Technology Assessment, and NHS Economic Evaluation Database), EMBASE, Ovid Medline, ERIC, HMIC Health Management Information Consortium, PsychINFO, PsycARTICLES, Psychology & Behavioural Sciences Collection, Health Source: Nursing/Academic Edition and CINAHL. Duplicates were removed and searches were limited to papers published in English.

The following search terms were used:

1) (brain injur* or head injur*)
2) (adult* or middleage* or middle age*)
3) (meta analysis or rct* or random* or blind*)
4) (control* and trial*)
5) (executive function* or planning or problem solving or strategy or strategies or goal or goals or reasoning or cogniti*)
6) (intervention* or treat* or therap* or train* or rehabilitat* or remediati*)
7) (cogniti* and (rehabilitat* or remediat* or train* or treat*))
8) effective*

* Denotes the truncation command meaning that the search will identify all words beginning with that term.

A flow diagram of the search strategy is shown in Figure 1. Articles identified by the search strategy were screened using the following inclusion criteria:

Inclusion criteria:

- Intervention studies addressing executive impairments in problem-solving or reasoning following ABI.
- Participants aged 16 – 65 years old.

Exclusion criteria:

- Studies published in a language other than English.
- Qualitative research, reviews, dissertations, conference abstracts and book chapters.
- Single case designs.
- Studies that did not include participants with a primary diagnosis of acquired brain injury (ABI) or traumatic brain injury (TBI).
- Studies describing surgical or pharmacological interventions.
- Studies that did not include a clear measure of problem-solving or reasoning ability.
- Studies on ‘goal planning’ as this is a therapeutic tool rather than a theoretically driven treatment.

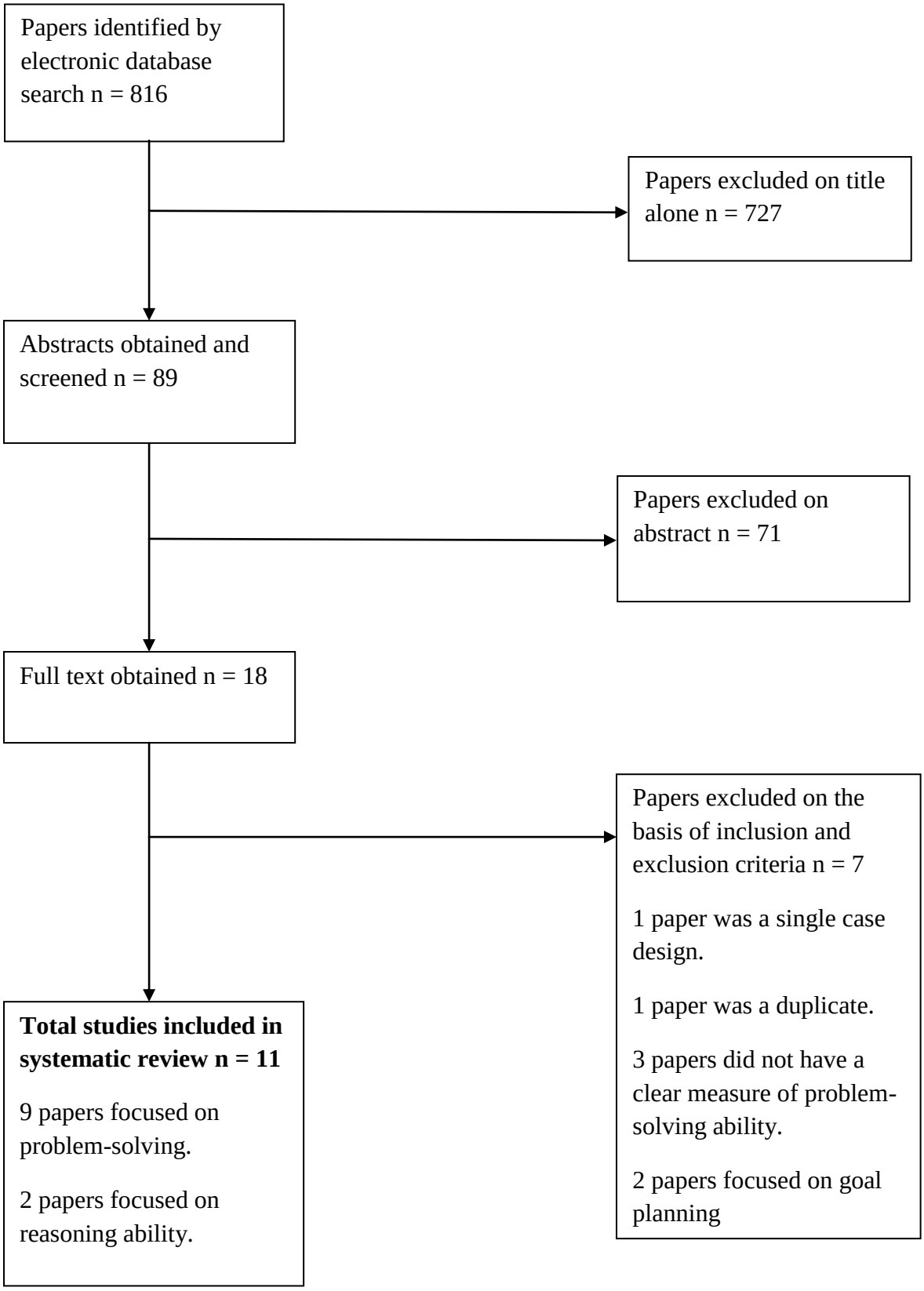

Figure 1: Flow Diagram of papers excluded at each stage of the search strategy

Using the search strategy outlined above, 816 studies were identified. 727 studies were excluded on the basis of the title alone, the vast majority pertaining to pharmacological intervention studies. Of the remaining 89 studies, a further 71 were excluded when the inclusion criteria were applied to the abstracts. The remaining 18 studies were retrieved in their full text form, of which 11 met all of the inclusion criteria.

The electronic search was supplemented by searching reference sections of included papers. In addition, a hand search of the key journals, *Brain Injury* and *Neuropsychological Rehabilitation* between January 2006 and July 2011 was conducted to identify any further articles. No further articles meeting the inclusion criteria were identified in these searches.

On reading the 11 papers it became apparent that there were two related areas of research studies: problem-solving abilities (9 papers) and reasoning (2 papers). For the purposes of this review the papers were reviewed under these categories.

Calculation of Effect Size

A variant of Hedge's g proposed by Morris and Deshon (2002) was used to calculate effect sizes in the present review. This approach focuses on effect sizes for pre-post designs and had been used in a review examining the effectiveness of cognitive rehabilitation (Rohling et al., 2009). Where multiple assessments were undertaken effect sizes were calculated for pre-post intervention and follow-up. In cases where means and standard deviations were not provided Hedge's g was calculated from the 'F statistic' of an ANOVA (U.S. Department of Education website, August 2011) or from Cohen's d (Durlak, 2009). Three of the studies reviewed did not provide sufficient information for effect sizes to be calculated.

Quality rating criteria

All of the studies were rated for quality using a quality checklist created by the first author (see Appendix 1.1). Criteria were based on the Scottish Intercollegiate Guidelines Network Methodology Checklist for the review of controlled trials (SIGN, 2004) and items specific to research within the ABI population were incorporated. There were 26 items, and studies were awarded a score of '1' if the criterion was met and '0' if the criterion was not met or if inadequate detail was provided. Each paper was given a rating out of 26 points and a

percentage rating was calculated based on this. These percentages of methodological quality were arbitrarily classified as high (≥ 70%), moderate (50 – 69%), or low (≤ 49%).

To assess the reliability of the rating checklist a second reviewer rated all 11 studies. Overall agreement was 91%. Individual disagreements were resolved by discussion with the independent reviewer.

Results

Tables 1 and 2 provide a summary of the included studies and their quality ratings for the problem-solving and reasoning intervention studies respectively.

Table 1 – Description and Quality Rating of Included Studies – Problem-Solving Interventions

Study	Quality Rating	Description of Intervention	Sample Characteristics	Problem-Solving Outcome Measures	Effect Sizes	Main Findings
Miotto, Evans, Souza de Lucia, and Scaff (2009).	High (77%)	Controlled trial. Participants were assigned to group-based attention and problem-solving (APS) treatment (G1) (n=10), an information/education (IE) approach (G2) (n=10), or treatment as usual (G3) (n=10). A crossover design was used ensuring that all participants received APS. APS included work on problem awareness, developing a plan, initiation and implementation. Training was delivered weekly lasting 1 hour and 30 minutes over 10 weeks.	n = 30, ABI. 15 males, 15 females. Mean age = 41.7 years (range 25-60). Mean time post-ABI = 2.4 years. Mean education = 9.17 years. Deficits in executive and everyday functioning.	1. WCST. 2. VIP. 3. DEX (BADS). 4. MMET.	1. G1 (g = 0.21); G2 (g = -1.05); G3 (g = -0.28). Follow-up (within-group): G1 (g = 0.00); G2 (g = 0.00); G3 (g = 0.00). 2. G1 (g = 0.25); G2 (g = -0.22); G3 (g = -0.23). Follow-up (within-group): G1 (g = 0.53); G2 (g = 0.59); G3 (g = 0.00). 3. <u>Patient</u>: G1 (g = -0.01); G2 (g = -0.03); G3 (g = 0. 08). Follow-up (within-group): G1 (g = -0.10); G2 (g = -0.20); G3 (g = -0.34). <u>Independent</u>: G1 (g = -2.21); G2 (g = -0.53); G3 (g = -0.49). Follow-up (within-group): G1 (g = -0.14); G2 (g = -0.12); G3 (g = -0.21). 4. G1 (g = 1.09); G2 (g = 1.09); G3 (g = 1.11). Follow-up (within-group): G1 (g = 0.00); G2 (g = 0.00); G3 (g = 0.00).	The APS programme significantly improved performance on the MMET and the VIP. These improvements generalised to real-life activities as rated by a close relative or carer on the DEX.
Man, Soong, Tam, and	Mod. (65%)	Randomised clinical trial. Participants assigned to	n = 103, ABI. Hong Kong	1. 16 target insight problems.	1. OCRG (g = 0.29); CCRG (g = 0.24); TCRG (g =	All training methods improved problem-

Hui-Chan (2006).		analogy problem-solving training groups: online training (OCRG) (n=25); computer-assisted training (CCRG) (28); therapist administered training (TCRG) (n=30); or a no-treatment control group (n=20). Training included homework, role-play, errorless learning and real-life examples delivered over 20 sessions lasting 45 minutes.	Chinese. 59 males, 44 females. Mean age = 45.09 years (range 18-55). Mean time post-ABI = 4.06 years. Had cognitive difficulties.	2. Problem-solving self-efficacy questionnaire. 3. Category Test for Adults (subtest I-VII). 4. LIADL.	0.34) 2. OCRG (g = 0.41); CCRG (g = 0.33); TCRG (g = 1.05) 3. OCRG (g = -0.20); CCRG (g = -0.30); TCRG (g = -0.13) 4. OCRG (g = 0.12); CCRG (g = 0.20); TCRG (g = 0.11)	solving skills. Therapist-administered group had a significant improvement in self-efficacy.
Rath, Simon, Langenbahn, Sherr, and Diller (2003).	Mod (65%)	Randomised outcome study. Participants were randomly assigned to standard group neurorehabilitation (n=19) or an innovative problem-solving group (n=27). The problem-solving training focused on emotional self-regulation using cognitive-behavioural techniques and training using a problem-solving skills model. Training was delivered over 24 sessions lasting 2 hours plus weekly 1 hour consolidation sessions and homework tasks.	n = 46, TBI (ranged from mild to severe). Initial enrolment data: 23 males, 37 females. Mean age = 43.6 years (range 22-64). Mean time post-TBI = 48.2 months. Mean education = 15.7 years. Impairments in social/ vocational functioning.	1. WCST. 2. PSI. 3. PSQ. 4. PSRPT.	Effect sizes are within-group: 1. WCST (g = 0.34). 2. PSI (g = 0.68). 3. PSQ Clear Thinking (g = 0.57); Self-Regulation (g = 0.43). 4. PSRPT (g = 0.61).	The innovative problem-solving group showed significant improvements on all of the problem-solving measures. Improvements were maintained at 6-month follow-up.
Fong and Howie (2009).	Mod (62%)	Controlled trial using matched pairs. Participants were randomly assigned to a group	n = 33. Moderate ABI. Hong Kong	1. Key Search and the Modified Six Elements (BADS).	1. Key Search (g = 0.32), Follow-up (g = -0.52); Modified Six Elements (g	Experimental group had significantly higher scores on the

		receiving problem-solving training which taught metacomponential strategies (n=16), or standard cognitive training (n=17). Problem-solving training focused on improving attention, problem representation, planning, self-monitoring and evaluating outcomes. Training was delivered over 22 sessions lasting 1 hour 15 minutes and included homework exercises.	Chinese. 27 males, 6 females. Mean age = 33.4 years (range 16-53). Mean time post-ABI = 12.3 months. Mean education = 10.4 years. Had cognitive difficulties.	2. SPSVM. 3. Means-Ends Problem-Solving Measure. 4. RPM. 5. Metacomponential Interview.	= 0.66), Follow-up (g = -1.08). 2. SPSVM (g = 0.76). 3. Means (g = 0.57); Ratio (g = 0. 06). 4. RPM (g = -0.00); Follow-up (g = 0.06). 5. Correctness Score (g = 0.67); Metacomponential Score (g = 0.31).	metacomponential interview. The benefits did not transfer to real-life situations.
Chen, Thomas, Glueckauf, and Bracy (1997).	Mod. (62%)	Semi-archival method. Participants had received hierarchically based computer-assisted cognitive rehabilitation (CACR). A matched control group had received other therapies such as speech therapy. CACR trains people on a sequence of programmes that are arranged from fundamental (attention) to more complex cognitive functions (problem-solving).	n = 40, TBI. 27 males, 13 females. Mean age = 28.23 years. Mean time post-ABI = 11.35 months. Mean education = 13.58 years.	1. Category Test (HRNB). 2. WCST. 3. Comprehension (WAIS-R).	1. HRNB (g = 1.21). 2. WCST (g = -0.05). 3. Comprehension (g = -0.04).	CACR treatment significantly improved performance on the WCST and HRNB; however there were no significant differences between the groups on the post-treatment measures.
Fasotti, Bremer, and Eling (1992).	Mod. (50%)	Study investigated whether a cueing procedure aimed at improving two basic text encoding skills (sentence translation and problem-schema understanding) could improve arithmetical-word	n = 40 ABI; 10 controls. ABI: 25 males, 15 females. Controls: 6 males, 4 females. ABI Mean age =	1. Analogous arithmetic word problems.	It was not possible to calculate the effect size.	The cueing procedure improved arithmetical-word problem-solving for frontal patients but not for those with left posterior lesions.

		problem-solving following head injury by comparing those with frontal brain damage (n=30), left posterior damage (n=10) and healthy controls (n=10). Cueing was delivered in a single session following assessment.	38.9 years. Controls Mean age = 33.3 years.			Frontal patients were not able to utilise the cueing procedure spontaneously.
von Cramon, Matthes-von Cramon, and Mai (1991).	Low (46%)	Participants were allocated to either a problem-solving training (n=20) or memory training (n=17) group. Training was delivered in 25 sessions over 6 weeks. Problem-solving training provided participants with techniques to break down complex multi-stage problems into more manageable portions.	n = 37, ABI. 24 males, 13 females. Median age = 44 years (range 18-60). Median time post-ABI = 7 months. Median education = 11 years. Impairments in problem-solving.	1. Tower-of-Hanoi. 2. Planning Test.	1. Tower-of-Hanoi (g = 0.94). 2. Planning Test (g = 1.25).	Problem solving training significantly improved performance on specific problem-solving tasks compared to memory training.
Foxx, Martella, and Marchand-Martella (1989).	Low (42%)	Participants were assigned to problem-solving strategy training (n=3) utilising modelling, self-monitoring, positive reinforcement, response practice and response-specific feedback or a no-treatment control group (n=3). Training had been modified to increase participation and practice. Rewards were given for exceeding criteria. Training	n = 6, TBI. 4 males, 2 females. Mean age = 28.17 years (range 24-31). Mean time post-TBI = 7.95 years. Specific problem-solving deficits.	1. Percentage of criterion questions correct for similar and dissimilar problem situations.	It was not possible to calculate the effect size.	Problem-solving strategy training resulted in a greater increase in the percentage of correct responses to similar and dissimilar problem situations compared to controls.

		was delivered in a group format over 4 sessions.				
Foxx, Marchand-Martella, Martella, Braunling-McMorrow and McMorrow (1988).	Low (42%)	Participants were assigned to problem-solving strategy training (n=3) utilising modelling, self-monitoring, positive reinforcement, response practice and response-specific feedback or a no-treatment control group (n=3). Rewards were given for meeting criteria. Sessions were given 3 times a week lasting 35-57 minutes.	n = 6. Severe TBI. 3 males, 3 females. Mean age = 25.33 years.	1. Percentage of criterion questions correct for similar and dissimilar problem situations.	It was not possible to calculate the effect size.	Problem-solving strategy training resulted in a greater increase in the percentage of correct responses to similar and dissimilar problem situations compared to controls.

Note: Effect sizes: g = 0–0.5 small, g = 0.5-0.8 medium, g > 0.8 large.

Key:

BADS - Behavioural Assessment of the Dysexecutive Syndrome.
DEX - Dysexecutive Questionnaire.
HRNB - Halstead-Reitan Neuropsychological Test Battery.
LIADL - Lawton Instrumental Activities of Daily Living Scale.
MMET - Modified Multiple Errands Task.
PSI - Problem-Solving Inventory.
PSQ - Problem-Solving Questionnaire.
PSRPT - Problem-Solving Role-Play Test.
RPM - Raven's Progressive Matrices.
SPSVM - Social Problem-Solving Video Measure.
VIP - Virtual Planning Test.
WAIS-R - Wechsler Adult Intelligence Scale – Revised.
WCST - Wisconsin Card Sort Test.

Table 2 – Description and Quality Rating of Included Studies – Reasoning Interventions

Study	Quality Rating	Description of Intervention	Sample Characteristics	Reasoning Outcome Measures	Effect Sizes	Main Findings
Vas, Chapman, Cook, Elliott, and Keebler (2011).	High (73%)	Randomised controlled trial. Participants were randomly assigned to either Strategic Memory and Reasoning Training (SMART) or information-based Brain Health Workshop (BHW) to compare the effects on gist reasoning. SMART included education, strategy training, real-life examples, and homework assignments. Training was delivered over 12 group sessions lasting 1 hour 30 minutes each over 8 weeks.	n = 28, TBI (mild-severe). 16 males, 12 females. Mean age = 43 years (range 20-62). Mean time post-TBI = 16.53 years. Mean education = 15.75 years. Moderate functional impairments.	1. TOSL. 2. Matrix Reasoning (WAIS-III).	1. TOSL (g = 0.99). Follow-up: (g = 0.04). 2. Matrix Reasoning (within-group SMART) (g = 0.62). Follow-up: (g = 0.22).	SMART significantly improved gist reasoning compared with the BHW immediately post-training and at 6 months follow-up. These effects generalised to measures of executive function and real-life functional activities.
Middleton, Lambert, and Seggar (1991).	Low (31%)	Participants were assigned to either computer-assisted treatment targeting attention and memory skills or reasoning and logical thinking skills. Treatment was delivered over 8 weeks. Each group received 96 hours of educational training; an additional 32 hours per group were specific to targeted area of treatment.	n = 36, ABI. 23 males, 13 females. Mean age = 27 years. Mean time post-ABI = 3 years.	1. Concept Formation (WJPEB). 2. Abstraction (SILS). 3. Block Counting.	It was not possible to calculate effect sizes.	Performance improved on all of the reasoning measures, however there was no differential effect of treatment condition.

Note: Effect sizes: g = 0–0.5 small, g = 0.5-0.8 medium, g > 0.8 large.

Key:
SILS - Shipley Institute of Living Scale.
TOSL - Test of Strategic Learning.
WAIS-III - Wechsler Adult Intelligence Scale Third Edition.
WJPEB - Woodcock-Johnson Psychoeducational Battery.

Problem-solving intervention studies

One study was rated as high, five moderate, and three low quality according to the rating criteria.

High Quality

Miotto et al. (2009) – 77%

This study investigated the effectiveness of group-based attention and problem-solving (APS) treatment compared to two control conditions: an information/education (IE) approach, and treatment-as-usual, in a crossover-design. The aim of APS is to reduce attention difficulties and encourage a more strategic and less impulsive approach to problem-solving. The design adopted for this study received the highest methodological quality rating as the pseudo-randomisation allowed the participants to be randomly allocated to group, thereby reducing bias, and also matched the groups on key characteristics such as age, education, and time since injury, which ensured they were comparable. The crossover design was ethically commendable as it ensured all participants received the experimental treatment, the only disadvantage being that there was no control group for the follow-up analyses. The paper clearly stated the inclusion criteria which included at least one deficit in executive functioning as identified by an independent professional. This criterion ensures that the treatment is targeting a clear deficit and that any effects of the treatment will be measurable. The study was limited by a small sample size and may have been underpowered in its ability to detect changes between the three groups. The sample was heterogeneous and no attempts were made to classify the severity of ABI thus making it difficult to generalise from the results. Investigators were not blind to treatment group and this introduces a source of bias which weakened the design of the study. Practice effects on measures such as the WCST and VIP need to be taken into consideration. This effect seems likely in this study as all of the groups improved over time. An attempt was made to reduce the effects of practice on the MMET by using different localities for the task at each assessment. The MMET provided the strongest evidence for the effect of APS and effect sizes were large for all three groups following treatment, with changes maintained at follow-up. This task measures executive functioning in a 'real-life' situation. Similarly the study attempted to measure any effects of the treatment that generalised to everyday functioning. As this should be the ultimate goal of

problem-solving treatment it is vital that these effects are measured. The measure adopted in this study was the Dysexecutive Questionnaire (DEX) completed by a carer or close relative and the participant themselves. The only criticism of this approach is that the carers/relatives were not blind to treatment condition so this cannot be considered an objective measure.

Moderate Quality

Man et al. (2006) – 65%

This randomised clinical trial compared the effectiveness of analogy problem-solving treatment delivered in three different modes: online; computer-assisted; and therapist administered, with a no-treatment control group. The results indicated that problem-solving improved in all of the treatment groups. Effect sizes were small for all of the measures apart from problem-solving self-efficacy in the therapist administered group which showed a large effect. The study did not include follow-up measures so it is unclear whether any benefits from the treatment were maintained. The study demonstrated good design: participants were randomly sampled from the population and randomly allocated to treatment group. No attempt was made to match the groups on key characteristics however the groups were not significantly different at the start of the trial. The study did not attempt to identify deficits in problem-solving ability prior to treatment and specifically excluded participants who performed below a 'mildly impaired' level on a range of cognitive tests. As such, it cannot be assumed that this treatment method would be effective for brain-injured individuals with identified difficulties in problem-solving. This treatment may only be applicable to those individuals with a higher level of functioning than is representative of the brain injury population in general. The severity of head injury in the sample is not specified making it difficult to generalise the findings from this sample. The inclusion criteria state that subjects had suffered an ABI with an onset $\leq$ 6 months, however the data show that the mean time post head injury ranged from 3.46 – 5.15 years across groups. The standard deviations are large and as such it is difficult to determine whether those with an onset time of less than 6 months were excluded. If not, then the effects of spontaneous recovery cannot be ruled out. Fortunately the study included a no-treatment control group which did help to control for these effects. Whilst no-treatment control groups can be questioned on ethical grounds this study did offer voluntary participation to the treatment after the assessments were completed.

The main outcome measure (target insight problems) was not validated. The utility of this measure can be questioned as, whilst the content was altered slightly, this was essentially an assessment measure that was trained as part of the treatment. The aim of the treatment was to train participants in generic problem-solving skills by instructing them to draw analogies. Whilst this approach is highly commendable the real-life measure adopted in the study focused on basic functional skills rather than the executive function components of real-life problem-solving. A further criticism is that the different modes of delivery of the treatment were not clearly differentiated. The computer-assisted training allowed support and performance feedback from a therapist if requested by participants and the online training was directed by a therapist who also provided positive feedback. This makes any conclusions regarding the reasons for the significant improvement in problem-solving self-efficacy in the therapist assisted treatment less certain. The authors state that the study was 'double-blind' however this claim is unlikely to be tenable as it would be very difficult to keep participants blind to treatment allocation and as participants were drawn from rehabilitation services we cannot rule out the possibility that they would not discuss their training with one another over the 20 sessions. Related to this, a particular strength of the study was that the investigators were blind to treatment allocation. The study also benefited from a reasonable sample size. Whilst the results for this study are encouraging they need to be interpreted with some caution in light of some methodological weaknesses.

Rath et al. (2003) – 65%

This study compared conventional neuropsychological rehabilitation with an innovative problem-solving treatment which incorporated strategy training and emotional self-regulation. There were a number of strengths in the study design: participants were randomly assigned to treatment group, severity of TBI was clearly documented, assessments were independently rated, and a range of validated measures were used. Whilst the study did not incorporate a no-treatment control group to control for spontaneous recovery, the treatments were designed to be as equivalent as possible in terms of frequency, length and format of sessions. Participants were at least one year post-injury which helped to control for any rapid recovery. Similar to Man et al. (2006) deficits in problem-solving ability were not specified within the inclusion criteria and therefore the rationale for treatment is questionable. No attempt was made to match the groups on key characteristics and separate demographic

information for the treatment groups is not provided so it is unclear whether the groups differed significantly. Demographic data are only provided prior to drop-out so it is also unclear who the experimental sample finally consisted of. Of note, the reported sample was 62% female which is surprisingly high and not-representative of the brain-injured population in general. The study reports an inclusion age range of 20-65 years but it is not clear why younger adults (16-20 years) were not included. Head injury is common in young adults so to be representative of the population it would seem important that inclusion criteria of studies in this area reflect this. Rather than comparing the treatment groups the statistical analyses focused on within-group paired-sample t-tests. Whilst the results of these tests indicated that there were small to medium-sized effects of the innovative treatment, due to the nature of the analysis it was not clear whether this was the result of the treatment or something generic to both groups such as therapist contact. Follow-up assessment was conducted but the raw data from this are not reported and effect sizes were again based on within-group effects so the efficacy of the treatment in comparison to a control remains unclear.

Fong and Howie (2009) – 62%

This study compared the effects of a problem-solving skills training programme using a metacomponential approach to conventional cognitive training. The study matched participants on key characteristics including age, gender, education, date and severity of injury, before randomly allocating a member of each pair to treatment group. This ensured that the groups were comparable prior to intervention. The study utilised a number of measures, of which some had been validated on brain injured populations such as the BADS and SPSVM. The investigators were not blind to treatment group which does introduce a source of bias to the results, particularly for measures with subjective ratings such as the Metacomponential Interview. Both groups received conventional cognitive training. By not controlling for the amount of therapist contact it is unclear whether the effects are due to the experimental treatment itself or just the additional input. The treatment itself was not well-controlled, training was meant to be delivered in a group format however individual treatment was provided for those who could not work in a group setting. Reasons for this were not provided, making it difficult to determine if this format of treatment would be suitable for other samples. Whilst this study did not conduct an intention to treat analysis the authors did

explain the reasons for drop-out and examined the demographic information to ensure the results were not biased. The results of the study are somewhat misleading and difficult to interpret. The experimental group scored significantly higher than the control group on the Metacomponential Interview following treatment; however they had significantly higher scores than the control group to begin with. It could be that this was a particular area of strength for the experimental group, or a particular area of weakness for the controls. Only three of the measures were repeated at follow-up and this did not include the SPSVM, the measure most closely related to real-life problem-solving. The large between-group effect sizes at follow-up are actually due to improvement in the control group and reduction of scores for the experimental group. The sample was exclusively Hong Kong Chinese and due to cultural differences the results may not generalise to Western countries and cultures. There are a number of weaknesses to the study design, a no-treatment control group was not used and the study does not provide details of the ABI such as severity and time since injury so factors such as spontaneous recovery cannot be ruled out. Whilst the study reports that participants had documented problem-solving deficits there was no clear evidence or assessment of these.

Chen et al. (1997) – 62%

The paper by Chen et al. (1997) examined the effectiveness of hierarchically based computer-assisted cognitive rehabilitation (CACR) following TBI. The control group were matched for age, education, days in coma, and time between testing to ensure they were comparable. As the study was retrospective, participants were not randomly allocated to treatment. The participants were selected from files spanning 1983 to 1991; therefore the time during which the treatment was undertaken is highly unlikely to be comparable between individual participants. A number of factors could have affected performance at different historical time points, such as quality of the computers delivering the intervention. The retrospective nature of the study means that a number of potentially confounding factors are unknown, such as severity of TBI. The assessors were not blind to treatment allocation and no follow-up data was collected. The treatment and control groups were not clearly differentiated. The authors state that the control group may have previously received low doses of non-hierarchical CACR. The difference between hierarchical and non-hierarchical CACR does not appear to be content, but rather the breadth and order of the topics covered. If the controls had been

exposed to any form of CACR this acts as a confounding variable. The results indicated that both groups improved on measures of problem-solving. This could be due to both groups having been exposed to CACR, or practice effects on measures such as the WCST. CACR is not a set programme and the length of time in treatment varied between participants. It is unclear how many sessions or hours of treatment were received by the experimental group. Furthermore, there was no evidence to suggest that the treatment had been implemented to address specific deficits.

Fasotti et al. (1992) – 50%

This study investigated whether a cueing procedure could improve arithmetical word problem-solving. Similar to the study by Miotto et al. (2009) the theory was that if a strategy could be learned to reduce impulsive behaviour, performance could be improved. Unlike the other studies in the current review, all the participants in this study took part in the training at the same time and performance between those with frontal lobe damage, left posterior brain damage and healthy controls was compared. Whilst the authors did examine CT scans and scan reports to confirm the location of the brain damage, the severity of the damage was not reported. There is also no assurance that the healthy controls did not have a history of ABI. The study did attempt to ensure that the controls were representative of the local population by matching them on IQ and they selected participants who did not practise mathematical activities in their profession to reduce performance bias. The study did not provide information on where or how participants were recruited thus it is difficult to determine whether or not the results can be generalised. Only one outcome measure was used and this was not validated. The study found that cueing improved performance for individuals with frontal lobe damage however no raw data were provided so effect sizes could not be calculated. Follow-up assessment was not consistent across participants (ranging from 2-4 days after treatment) thereby reducing the validity of the results. At follow-up participants with frontal lobe damage were not able to initiate the cueing procedure spontaneously. Compared to the other studies the intervention time was very short (one session) and may not have been sufficient to produce long-term change.

Low Quality

von-Cramon et al. (1991) – 46%

von-Cramon et al. (1991) compared the effectiveness of problem-solving training (PST) with memory training. Similar to other studies in this review, the aim of the PST was to train participants to adopt a slower and more controlled approach to solving problems. The study took place in a rehabilitation setting where, for ethical reasons, it was not possible to withhold treatment so two comparable therapeutic groups were used. Participants were not randomly allocated to treatment group or matched for key characteristics, and the severity of ABI was not disclosed. The sample included participants whose brain injury had occurred less than 6 months ago so the effects of spontaneous recovery cannot be ruled out, particularly as the study did not have a no-treatment control group. A notable strength of the study was the initial screening process which identified those with problem-solving difficulties. The only concern being that the measures used were then repeated post-treatment so practice effects may have affected the results. It is unclear how well-controlled the training procedures were. The authors state that the training was delivered in a group format however participants were seen individually if they showed marked apathy. The number of participants who received group versus individual training is not specified and therefore it is difficult to compare the treatment to other studies in terms of the therapeutic input required. The PST improved performance significantly on the two problem-solving measures and the effect sizes were large. These results need to be interpreted with some caution as one of the measures (planning test) had been developed for the purposes of the study and was not validated. Investigators were not blind to treatment group so bias may have influenced the results. The increase in scores required to be considered an improvement was arbitrarily determined and lacked scientific rigour. The authors state that post-treatment scores could not be obtained for all participants but they do not provide a reason for this, again this may have biased the results. It is not clear from the paper at what time point participants were assessed post-treatment and no follow-up data are provided so we do not know if effects were maintained. The authors concede that their PST was not a scientific process and depended heavily on therapist expertise, even describing this as an 'art'. This raises considerable concerns regarding possible future replication of the study.

Foxx et al. (1989) – 42%

This study evaluated group problem-solving strategy training following ABI. The study was a modification of the method used by Foxx et al. (1988) and focused on encouraging a greater involvement in training sessions by requiring all participants to respond to each question, rather than taking turns. The sample size was very small (n=6), participants were not randomly allocated to treatment group or matched for key characteristics, and the severity of TBI was not disclosed. The study benefited from the inclusion of a no-treatment control group. The authors state that the participants displayed problem-solving deficits but there is no evidence of formal assessment. One of the experimental group members had acted as a control in the study by Foxx et al. (1988) which used the same outcome measures so practise effects cannot be ruled out. Investigators were not blind to treatment allocation although attempts were made to improve the reliability of rating by having two therapists rate every 4th session. There was only one main outcome measure and this was not validated. Participants were paid for their participation and received a bonus if they exceeded a target which was based on their performance in the previous session. It could be argued that there was a financial benefit to poor performance in the initial sessions to ensure that a bonus was always achieved. Deception was used by participants' carers to elicit problem-solving behaviour in staged situational interactions. These methods are ethically concerning and scientifically questionable as the situations were not objectively rated and were reliant on the carer's ability to record from memory what the participant said. Due to the small sample size meaningful statistical analyses were not possible. The authors report the mean percentage of correct responses. The scores were higher for the experimental group but as both groups showed improvement it is difficult to ascertain whether there was a significant difference between the groups. Follow-up data were reported but again formal statistical analyses were not conducted. The study claimed that the results showing an improvement on 'untrained' situations indicated generalisation of the problem-solving training. The 'untrained' situations only differed from the 'trained' situations in the content of the problem presented. Participants were observed to go into the assessment sessions verbally rehearsing the strategy they had been taught in the training sessions. The study does not present evidence that participants would use the strategy in un-cued situations. Due to the small sample size and absence of a controlled scientific design it is difficult to draw firm conclusions from the results of this research.

Foxx et al. (1988) – 42%

This study investigated the effectiveness of group problem-solving strategy training following TBI. Similar to Foxx et al. (1989) the sample size was very small (n=6), participants were not randomly allocated to treatment group or matched for key characteristics, and problem-solving deficits were not formally assessed. The severity of TBI was detailed however there was no mention of the diagnostic criteria used. The study benefited from the inclusion of a no-treatment control group. It is unclear how long the training lasted as the authors stated that participants were only allowed to progress in the training once a certain criterion had been reached. The session times were also variable (ranging from 35 to 75 minutes) so the total training time cannot be established. Investigators were not blind to treatment allocation so the results may have been biased. Similar to Foxx et al. (1989) deception was used, however the authors state that participants were debriefed afterwards and consented to the information being used. Whilst the results suggest that the experimental group did improve on the tasks following training, the scores for the control group also increased. It is uncertain whether this was due to practice effects or spontaneous recovery. Formal statistical analyses were not carried out and due to a number of methodological weaknesses it is difficult to draw meaningful conclusions from the results of this study.

<u>Reasoning intervention studies</u>

One study was rated as high and the other low quality according to the rating criteria.

High Quality

Vas et al. (2011) – 73%

This randomised controlled trial compared the effectiveness of top-down Strategic Memory and Reasoning Training (SMART) to an information-based Brain Health Workshop (BHW). The aim of SMART is to help participants construct generalised meanings which in turn reduces cognitive overload. The results indicated that SMART significantly improved gist-reasoning compared to BHW and the effect size was large. Executive function also improved (medium effect size) showing that the effects of the training generalised to other cognitive functions. The effects were maintained at follow-up. The study demonstrated good design:

participants were randomly allocated to treatment group and the groups did not differ significantly in key characteristics or baseline measures at the start of the trial. The severity of TBI and diagnostic criteria used were clearly detailed. Investigators were blind to treatment allocation and the primary outcome measure of gist-reasoning had been previously validated in a TBI population. Responses were audio-recorded and rated by two independent examiners. Both treatment groups were controlled for the number of contact hours and training took place within small groups of equal numbers to control for the effects of social bonding. The training protocol was manual-based and therefore could be easily replicated. The study did not attempt to identify deficits in reasoning ability prior to treatment so it is unclear whether the treatment would be applicable to groups with pronounced difficulties. There were a number of participant drop-outs over the course of the study and an intention to treat analysis was not conducted. The time-period during which assessment took place after treatment, and at follow-up, varied between participants and may have affected the results. The results of the study are encouraging, but in light of the modest sample size and number of drop-outs, need to be interpreted with some caution.

Low Quality

Middleton et al. (1991) - 31%

This study evaluated the effectiveness of computer-assisted neuropsychological treatment targeting either attention and memory or reasoning and logical thinking. The study suffered from a number of methodological weaknesses: there was no information on where the sample was taken from, participants were not randomly allocated to treatment, and there was no assessment of reasoning deficits. The participants had a medically documented brain injury but there was no information on severity. The range of time since injury was not provided and therefore the effects of spontaneous recovery cannot be ruled out. The treatments do not appear to be clearly differentiated. Both groups received 96 hours of educational training which focused on improving attention, perceptual skills and problem-solving, therefore we would expect some improvement on these measures in both of the groups. One of the primary outcome measures (Block Counting) was not validated and had a ceiling effect as several participants obtained a perfect score at baseline. No information was provided on who conducted the assessments and whether they were blind to treatment allocation. The

data presented are somewhat misleading as they report on percentage improvement and it was not possible to calculate effect sizes. If the range of scores on a scale is low you are much more likely to see a significant percentage improvement than if you use a scale with a higher range of scores. It was not appropriate to conduct a t-test on this data. The degrees of freedom for some of the calculations would suggest that participants dropped out but the study does not provide information on this. The study did not find a significant effect of treatment. Both of the treatment groups showed improvement which could be due to practice effects on the measures or poor differentiation of the treatments received.

Discussion

Problem-solving interventions

This systematic review of the problem-solving literature only revealed one high quality paper (Miotto et al., 2009). This study found a significant effect of attention and problem-solving treatment which was maintained at six month follow-up, with large effect sizes. A critical component of the training was the use of a 'STOP: THINK' strategy which encouraged participants to focus on the problem and interrupted impulsive behaviour. The use of the DEX questionnaire in this study provided a measure of the transfer of training to real-life tasks. It is unclear whether the benefits of this intervention were due to the attention or problem-solving aspects of the intervention. Attention is an important component of problem-solving (Evans, 2001) and it may be that difficulties in attention need to be ameliorated for problem-solving training to be effective. Training took place over ten sessions, this is significantly less than the other problem-solving interventions and the results represent a good return for clinician input. This was the only study in the review to adopt a crossover design. This study design was particularly efficacious as it created a no-treatment control group whilst also reducing ethical concerns as all participants received the treatment over the course of the study.

The majority of papers in this review were rated as being of moderate quality. Overall these studies provide support for the efficacy of interventions for problem-solving following ABI. The effect sizes in these studies ranged from small to large; however these effect sizes need to be interpreted with caution in light of some of the methodological weaknesses. None of the moderate quality studies identified deficits in problem-solving by means of a formal assessment prior to treatment. It is important when assessing the efficacy of an intervention that clear deficits in the cognitive domain being targeted are assessed and identified. As treatments for cognitive deficits should be applied to impaired groups it is important that they are piloted on similar samples, otherwise the clinical effectiveness of the intervention is unclear. Only two of the moderate quality studies (Rath et al., 2003; Fong & Howie, 2009) provided follow-up data so it is not clear whether any of the gains reported in the other studies were maintained. Although evidence for change without follow-up is of academic interest, the clinical value of intervention depends on improvement persisting after the formal intervention has ended. Only one of the moderate quality studies included a measure relevant

to everyday functioning (Man et al., 2006). A number of studies reported improvements in the control group between pre- and post-assessment (Rath et al., 2003; Fong & Howie, 2009; Chen et al., 1997). Change of this kind could be due to spontaneous recovery, practice effects on the assessment measures, poor differentiation of the treatments being delivered or the effects of general therapeutic input (Rohling et al., 2009). Most of the studies repeated measures with which practice effects would be expected, such as the WCST. A further weakness was the often poor differentiation between the control treatment and the experimental treatment under investigation. In order to properly investigate the effect of problem-solving treatments it is essential that there is a no-treatment control group or that the comparison treatment does not overlap significantly with the experimental treatment in either content or theoretical concepts. Alternative forms of outcome measures should be used for the pre- and post-assessments to reduce practice effects. In order to limit effects of spontaneous recovery, participants should not be recruited prior to six months post-injury. Two of the moderate quality studies (Man et al., 2006; Fasotti et al., 1992) used primary outcome measures that were not validated. This makes it difficult to generalise from their results. Two of the studies (Man et al., 2006; Chen et al., 1997) used computer-assisted cognitive rehabilitation and both report a significant improvement in problem-solving. Computer-based rehabilitation could be an economical means of delivering problem-solving training whilst increasing skills and encouraging independent functioning. The computer-based study with the most significant findings (Man et al., 2006) had therapist input (either direct or remote) on all of the computer-based treatments and this may be an important component of the intervention. In addition to problem-solving skills one of the studies (Rath et al., 2003) incorporated cognitive behavioural therapy for emotional self-regulation. The authors posit that emotional self-regulation can reduce impulsive behaviours, however as no data for between-group effects was provided no conclusions can be drawn about the efficacy of this approach to problem-solving. The problem-solving training programmes ran over 22 sessions on average, this is significantly higher than the number of sessions in Miotto et al. (2009).

Three of the studies in this review were rated as low quality. All of these studies reported an improvement in problem-solving following intervention. Effect sizes could not be calculated for two of the studies (Foxx et al., 1988; Foxx et al., 1989), however effect sizes for the third

study were large (von-Cramon et al., 1991). The aim of the problem-solving training in the study by von-Cramon et al. (1991) was to encourage participants to adopt a slower and more controlled approach to problem-solving. None of the participants in these studies were randomly allocated to treatment, investigators were not blind to treatment allocation, outcome measures were not validated, and interventions were poorly controlled. The results of these studies need to be interpreted with caution due to these methodological weaknesses.

Reasoning Interventions

Only one of the reasoning studies was rated as high quality (Vas et al., 2011). This study found a significant effect of the reasoning intervention with large effect sizes. Effects were maintained at six month follow-up and were shown to generalise to a measure of executive function and real-life functioning. The measure of real-life functioning was self-report and cannot be viewed as an objective measure of improvement on real-life tasks of reasoning. The measure of executive function was the WCST which is vulnerable to practice effects (Basso, Lowery, Ghormley & Bornstein, 2001). The aim of the training was to help reduce cognitive overload to improve the efficiency of reasoning. Training took place over twelve sessions. This is significantly lower than the average number of sessions in the problem-solving training and the results represent a good return for clinical input. The second study (Middleton et al., 1991) was rated as low quality. This study also found that training improved reasoning, however there was no differential effect of treatment. This study suffered from a number of methodological weaknesses and it was not possible to calculate effect sizes. There is not sufficient evidence to draw firm conclusions about the efficacy of interventions for reasoning following ABI; however, similar to the problem-solving literature, the results are generally supportive of the efficacy of interventions in this area.

Overview

The findings of the current review replicate those of Cicerone et al. (2000; 2005). There is evidence for the effectiveness of interventions for problem-solving following ABI. Cicerone et al.'s (2000; 2005) reviews included single case studies whereas the current review has benefited from subsequent research of higher design quality. The current review found evidence for the efficacy of interventions targeted at specific cognitive functions, supporting the recommendations of Rohling et al. (2009). Kennedy et al. (2008) recommend the use of

MSI in problem-solving interventions. Whilst there are components of MSI within the majority of the problem-solving interventions in the current review, the most effective studies have benefited from strategies to interrupt impulsive action and focus attention on the problem. Evidence for supportive psychotherapy was only found in one of the studies, suggesting there is not strong evidence for this type of intervention.

Limitations

Three of the studies reviewed did not provide sufficient information for effect sizes to be calculated and therefore it would not be possible to conduct a meta-analysis. There were only two intervention studies focused on reasoning and therefore firm conclusions about the efficacy of interventions in this area could not be drawn.

Implications for Future Research

This review has highlighted that there are very few intervention studies for executive impairments in problem-solving or reasoning following ABI. Further research is recommended and should focus on interventions designed to target clear deficits in problem-solving and reasoning. Future studies should adopt a rigorously controlled design, ideally comparing treatments in a randomised controlled trial. Research designs that use three groups (experimental, treatment control, and no-treatment) help to control for the effects of therapist contact and spontaneous recovery. Incorporating a crossover design is ethically commendable as this ensures that all groups have access to treatment. The treatments used should be clearly differentiated and target different cognitive domains. Alternative forms of validated outcome measures should be used for pre- and post-assessments to reduce practice effects. In order to increase the ecological validity of interventions, future studies should incorporate measures of problem-solving or reasoning in real-life situations.

Clinical Recommendations

There is considerable support for the efficacy of interventions for executive impairments in problem-solving following ABI. The critical component of these training programmes appears to be learning a strategy to inhibit impulsive action and focus attention on the problem. A combined attention and problem-solving training programme has been shown to have significant effects over a short period of time. This training enables clients to generate

solutions to everyday problems such as how to make sure all the electrical items in the house are turned off before going out. Computer-based cognitive rehabilitation is also effective in improving problem-solving and may represent an economical means of delivering treatment, increasing skills and facilitating independent functioning. The research on interventions for executive impairments in reasoning following ABI is limited however there is preliminary support for gist-reasoning training which reduces cognitive overload and improves the efficiency of reasoning. The strategies identified in the current review are evidence-based and should be applied in rehabilitation to address deficits in problem-solving and reasoning. Future research should focus on more rigorously controlled studies targeting specific deficits in executive impairments in problem-solving and reasoning.

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CHAPTER TWO: MAJOR RESEARCH PROJECT PAPER

Can deficits in empathy after severe head injury be improved by compassionate imagery?

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Lay summary:

Head injury (HI) can have a significant impact on empathy (Lippert-Grüner, Kuchta, Hellmich & Klug, 2006). In some cases the effects are short term and disappear as the individual recovers, however when brain injury is more severe the changes can appear to be permanent. It is unclear whether these changes are permanent or if it is an ability which has been 'damaged' and could be repaired. There has been interest in mindfulness-based approaches for development of empathy outwith the area of brain injury. One such approach is Compassionate Mind Training (CMT) (Gilbert & Procter, 2006). Compassionate imagery is a therapeutic technique that is often used within CMT. Images can have powerful emotional effects and may alter how an individual relates to themselves and others. It has been suggested that a fear of compassion can sometimes prevent people from benefitting from compassion-focused therapy. This pilot study aimed to investigate whether a single session of compassionate imagery could increase empathy after severe head injury. 24 participants were recruited and assigned to either a session of compassionate imagery or a control session of relaxation. Participants completed questionnaires measuring fear of compassion, empathy, self-compassion and relaxation. Compassionate imagery did not significantly increase empathy following head injury however there was a non-significant increase in self-compassion overall. Fear of compassion did not explain the findings. Further research in this area using treatment interventions that take into account HI factors, or are of longer duration, is recommended.

Abstract:

Objective: Head injury (HI) can result in problems in the ability to empathise however it is unclear whether these changes are permanent or if it is an ability which has been damaged and could be repaired. There has been a recent focus on the use of compassionate imagery to increase feelings of compassion. Images can have powerful emotional effects and may alter how an individual relates to themselves and others. This pilot study aimed to investigate whether compassionate imagery could increase empathy in individuals with HI compared to a control group receiving relaxation. *Design:* The study employed a between-group repeated measures design. 24 participants with severe head injury and low empathy were recruited and randomly allocated to a single treatment session of compassionate imagery or a control condition of relaxation. *Methods:* Empathy, self-compassion and relaxation were measured pre and post-intervention and a measure of fear of compassion was included as a potential co-variate. *Results:* There was no significant effect of compassionate imagery on empathy following severe head injury. An increase in self-compassion overall approached significance. Fear of compassion did not correlate with change in self-compassion or empathy. *Conclusions:* Further research with this population is warranted to determine if an intervention that takes into account HI factors or is of greater duration would be beneficial.

Introduction

Each year in the UK, over 1 million people will attend hospital as a result of an acquired brain injury, of which 100,000 are left with significant disability (Headway, 2009). The incidence of head injury (HI) is higher amongst males and individuals living in areas characterised by socioeconomic deprivation. There is a bimodal peak incidence of HI in people aged 15-24 and over 70. The most common causes of HI in younger people are road traffic accidents and assaults, whilst in the elderly it is falls (Deb & Burns, 2007).

The significance of HI can be underestimated. There is often a good physical recovery whereas cognitive and emotional problems may not be immediately obvious (Prigatano, 1999). HI can have a significant impact on empathy and cognitive functioning, resulting in disinhibition, aggression, irritability and impairments in executive function, including memory, attention, impulsivity and speed of processing (Howitt, 2002). These difficulties are particularly common following severe HI (Lippert-Grüner et al., 2006).

Personality changes are often cited by friends and family as the most difficult aspect of HI to cope with, in particular aggression, social disinhibition, impulsivity, and a lack of empathy. In some cases the effects are short term and disappear as the individual recovers, however when brain injury is more severe the changes appear to be permanent. This can have a significant effect on interpersonal relationships; the reported rates of marital breakdown five years after severe HI range from 42% - 78% (Thomsen, 1984; Wood & Yurdakul, 1997). Empathy is considered to be vital in effective interpersonal relationships (Davis & Gold, 2011), and deficits in empathy are thought to be common after head injury (Williams & Wood, 2010). Empathy is viewed within a social cognition framework, composed of both a cognitive process and an affective ability. Fundamental to the former are likely to be cognitive flexibility, perspective taking and role-taking, and emotional sensitivity and responsiveness to the latter (Eslinger, 1998). There is some evidence to support a view that brain injury is associated with both lower cognitive and affective measures of empathy; Shamay-Tsoory, Tomer, Goldsher, Berger and Aharon-Peretz (2004) found that patients with prefrontal lesions were impaired in both cognitive and affective empathy compared to patients with parietal lesions and healthy controls. This may be complex with different combinations of reduced affective and cognitive empathy associated with different areas of

prefrontal lesions (Eslinger, 1998). Furthermore, a small percentage of people may exhibit an increase in empathic responding after cerebral damage; Eslinger (1998) found that 5% of his sample of patients with HI demonstrated heightened sensitivity to the emotional states of others. Empathy influences behaviour, i.e. those with high empathy should behave in a more responsive way to the perceived feelings of another. Kaukiainen et al. (1999) found that empathy (cognitive and affective combined) was negatively correlated with aggression. HI can result in problems in the ability to empathise (Eslinger, 1998), however it is unclear whether these changes are permanent or if it is an ability which has been 'damaged' and could be repaired.

Most research on psychological interventions following HI is aimed at the relatively small proportion of cases with challenging behaviour (Rothwell, LaVigna & Willis, 1999). Research on other forms of therapy that encompass the cognitive and emotional aspects of functioning is limited and findings are mixed (Anson & Ponsford, 2006; Rees, Marshall, Hartridge, Mackie & Weiser, 2007; and Kinney, 2001). There has been interest in mindfulness-based approaches for development of empathy more generally outwith the area of brain injury. The aim is to improve perspective taking and empathic concern; the hypothesis being that a skill in non-judgementally processing information in the current moment (Block-Lerner, Adair, Plumb, Rhatigan, & Orsillo, 2007) is effective when applied to mental health difficulties such as recurrent depression, anxiety, shame and low self-esteem (Teasdale et al., 2000; Gilbert & Procter, 2006), and in turn can aid interpersonal functioning (Neff, 2006). Psychological therapy when applied in this way can ease distress and suffering. The research in this area has largely focused on adult populations with intact cognitive functioning and there is little research about the effectiveness of psychological therapies when applied to adults with brain injury.

Compassionate Mind Training (CMT) (see Appendix 2.2 for further information) is a compassion-based therapeutic approach developed by Gilbert and Procter (2006). CMT seeks to alter a person's whole orientation to self and relationships by utilising these competencies for self-to-self relating. Compassionate imagery is a therapeutic technique that is often used within CMT. For centuries within Buddhist healing practices, developing compassion for self and others has involved using structured compassionate images that are

practised regularly. There is evidence to suggest that the use of compassionate imagery can stimulate feelings of compassion. Gilbert and Irons (2004) found that the use of compassionate images enabled self-critical people to self-soothe. Images can have powerful emotional effects and may alter how an individual relates to themselves and others. Progressive Muscle Relaxation (PMR) (Jacobson, 1938) has been successfully applied in the treatment of anxiety disorders. PMR aims to reduce muscle tension and in turn inhibit the generation of unhelpful thoughts and emotions (Conrad & Roth, 2007). PMR is often included as a component of anger treatment programmes for people with brain injury (Demark & Gemeinhardt, 2002); however there is no evidence to suggest that PMR could target aspects of personality, such as empathy, in this population.

This pilot study investigated whether compassionate imagery would increase empathy in individuals with HI compared to a control group receiving relaxation.

Hypothesis:

- A greater increase in empathy will arise from compassionate imagery than from relaxation in individuals with a severe head injury.

Research Questions:

- Is there a significant effect after a single session intervention?
- Is there a differential effect of intervention?
- Are there within-group treatment effects?
- Does fear of compassion affect responsiveness to the intervention?

Methods

Approval

Ethical approval was obtained from NHS West of Scotland Research Ethics Committee (Appendix 2.3). Management approval for the protocol was granted by NHS Greater Glasgow and Clyde (Appendix 2.4) and NHS Ayrshire and Arran (Appendix 2.5) Research & Development Directorates.

Design

The study employed a between-group repeated measures design with two levels of independent variable: treatment session of compassionate imagery, and a control condition of relaxation. The dependent variables were empathy, self-compassion and relaxation. A measure of 'fear of compassion' was included as a potential covariate.

Sample Size Considerations

The required sample size was difficult to calculate as there were no published studies of this kind. Previous literature had shown that the Self-Compassion Scale can reliably differentiate between performance pre- and post- treatment intervention. A study by Shapiro, Brown, and Biegel (2007) compared performance on the Self-Compassion Scale before and after an 8-week Mindfulness-Based Stress Reduction intervention. Using data from this study (mean score pre-intervention = 18.06, SD = 3.97; mean score post-intervention = 20.92, SD = 3.84), the effect size was large (dz = 0.73), resulting in a power of 0.95 (dz is the Cohen effect size for a repeated measures design).

Given that this is a preliminary study a more conservative effect size was considered to be adequate. For a medium effect size (dz = 0.5) with power at 0.8, and alpha set at .05, it is estimated that 14 people per group would be required (total n = 28) (G*Power 3; Faul, Erdfelder, Lang & Buchner, 2007). Due to the time restrictions on recruitment in this study recruitment was aimed at two groups of 10 (total n = 20) with a plan to conduct post-hoc effect-size calculations to inform future research in this area.

Participants

Participants were recruited from Headway in Ayrshire, community brain injury services in West Dunbartonshire and Ayrshire, and an inpatient rehabilitation unit in Glasgow.

Inclusion criteria: 18 - 65 year olds with history of severe HI as measured by post-traumatic-amnesia of more than one day (Russell, 1935). The HI occurred at least three months prior to the date of testing. Participants had low empathy as identified by an initial screening session or as part of a separate study on empathy. Low empathy was defined by scores 1sd below the average for published norms for the Basic Empathy Scale (< 54.5 for males; < 67 for females) or the Balanced Emotional Empathy Scale (total score < 23) (Mehrabian, 2000). Signed informed consent was obtained before testing, and only those considered to have capacity to consent were approached.

Exclusion criteria: Individuals with learning disability; current diagnosis of deteriorating neurological condition such as dementia; ongoing alcohol and/or drug problems; visual or hearing impairment; severe communication difficulties (which may affect ability to consent, understand test instructions, or respond reliably) or severe mental illness (e.g. psychosis), which in the judgement of the clinical team and/ or experimenter would prevent effective participation in the study.

Forty-four participants met the initial inclusion criteria. Following completion of the baseline measures, twenty-four of these participants met the criteria for low empathy and were recruited to take part in the study. These included 3 females and 21 males. All were white British nationals. Mean age was 42.21 years (SD = 13.61), and HI had been sustained at least three months prior to the present study (median = 99.5 months post-injury, range = 3 - 468 months). 13 (54.2%) had been in a road traffic accident, 7 (29.2%) an assault and 4 (16.7%) a fall. The Wechsler Test of Adult Reading (WTAR; Wechsler, 2001) was used to estimate pre-morbid verbal IQ (median = 90.5, range = 84-110). The mean age for leaving school was 15.25 years (SD = 0.79) and only nine participants had completed standard grade level exams with five going on to complete college courses and one participant had completed a university degree (prior to his HI). Deprivation rank was derived from postcodes using the Scottish Index of Multiple Deprivation 2009 (SIMD) (Scottish Government, 2009). The

scale is based on 7 domains (income, employment, health, education, skills and training, housing, geographic access and crime). SIMD scores range from 1 (most deprived) to 6,505 (least deprived) and in the sample ranged between 84 and 4626. Deciles can be calculated, whereby the Scottish population is divided into 10 equal categories of 10% (1 = most deprived, 10 = least deprived).

Participants were randomly allocated to a treatment session of compassionate imagery or a control treatment session of relaxation using a randomisation code generated online (Randomisation Code Website, May 2011, seed no. 26344).

Measures

Demographics

Participants were asked for information regarding their age, postcode, years of education, ethnicity, cause and date of HI. Where there was more than one HI involving loss of consciousness, the date of the most recent injury was taken.

All interventions and assessments were undertaken by the first author with the exception of the pre-intervention assessments for 8 participants which were conducted as part of a separate study.

Measures taken prior to intervention or as part of a separate study:

1. Basic Empathy Scale. This provides a measure of self-reported empathy. It is a 20 item scale comprising cognitive and affective empathy components. Participants rate each item on a Likert scale from 1 representing 'Strongly Disagree' to 5 representing 'Strongly Agree'. This measure has been shown to have good construct validity (Jolliffe & Farrington, 2006).

2. Balanced Emotional Empathy Scale. This test is a measure of emotional or affective empathy. It is a 30 item (15 positively worded and 15 negatively worded) self-report measure of the ability to vicariously experience another individual's emotions. Participants rate each item on a 9-point scale ranging from -4 representing 'very strong disagreement' to +4 representing 'very strong agreement'. A total score is

calculated by subtracting the sum of responses to the negatively worded items from the sum of responses to the positively worded items (Mehrabian, 2000). This measure has been shown to have excellent internal consistency (Cronbach's alpha of .87) (Mehrabian, 1997).

3. The Symbol-Digit Modalities Test. This is a measure of executive function, requiring attention, visual scanning and motor and psychomotor speed. It is used as a screening tool for cerebral dysfunction due to its sensitivity in detecting brain damage (Western Psychological Services Website, May 2010). The psychometric properties of this test are well established and it has been shown to have good validity and reliability (Cronbach's alpha of .80) (Smith, 1973).

Measure administered prior to intervention:

4. Fears of Compassion Scales (Gilbert, McEwan, Matos & Rivis, 2010). These three scales measure fears of: compassion for others (10 items), compassion from others (13 items), and compassion from self (15 items). The items are rated on a 5-point Likert scale (0 = Don't agree at all, 4 = Completely agree). A fear of compassion may inhibit the capacity of compassionate imagery to increase self-compassion and empathy. This measure has been shown to have good reliability (Cronbach's alphas ranging from .76 to .92).

Measures administered pre- and post- intervention:

5. The Self-Compassion Scale (Neff, 2003). This scale measures the degree to which individuals display self-kindness against self-judgement, common humanity versus isolation, and mindfulness versus over-identification. Participants rate each item on a Likert scale ranging from 1 (almost never) to 5 (almost always). This measure has good reliability (Cronbach's alphas ranging from .75 to .81). A randomisation code was generated online (Randomisation Code Website, May 2011, seed no. 4322) to split the scale equally into two, with half of the items given pre- and half post-intervention (Appendix 2.6). The total self-compassion scores pre- and post intervention were compared. Self-compassion was expected to increase following the compassionate imagery session.

6. The Empathy Quotient (Baron-Cohen & Wheelwright, 2004). This self-report questionnaire contains 60 items; 40 empathy items and 20 control items. 'Empathy' in this scale is composed of combined cognitive and affective components. Lawrence, Shaw, Baker, Baron-Cohen and David (2004) examined the empathy items and removed those that correlated with socially desirable responding. A principal components analysis reduced the scale to 28 empathy items divided across three factors: cognitive empathy, emotional reactivity, and social skills. This model was used for the current study. The scale was reduced to 10 cognitive empathy items; 10 emotional reactivity items; and 6 social skills items (see Appendix 2.7 for further information). A randomisation code was generated online (Randomisation Code Website, May 2011, seed no. 21252) to split and balance the scale for cognitive, emotional and social items. Half of the items were given pre- and half post-intervention (Appendix 2.8). Responses are given on a 4-point scale ranging from 'strongly agree' to 'strongly disagree'. An 'empathic response' is scored 1 or 2, depending on the magnitude of the response. 'Non-empathic' responses are scored zero, regardless of the magnitude. Empathy was expected to increase following the compassionate imagery session.

7. Relaxation measure. Participants completed a self-report measure of relaxation before and after the intervention (Appendix 2.9). Responses are given on a 7-point Likert scale. Feelings of relaxation were expected to increase more in the relaxation session than in the compassionate imagery session.

<u>Intervention</u>

Compassionate imagery and relaxation sessions were for the same length of time and involved practising breathing techniques, relaxation and mental imagery. A session script was used to ensure that each participant received a standard intervention (see Appendices 2.10 and 2.11).

Procedures

Contact was made with the clinics to provide information about the research study. In addition, as part of a separate study on empathy, participants who were identified as having low empathy were asked if they would be interested in taking part in this research project. If so, their details were passed to staff at the HI unit who then contacted the researcher. Participants who consented to take part in the research were then contacted. They were provided with an information sheet (Appendix 2.12) and written consent form (Appendix 2.13). They were also informed that if they consented to take part in the research their GP would be informed. The researcher answered any questions and arranged a time to meet for testing.

Information on demographics, history of HI, GP contact details and baseline measures of empathy, pre-morbid IQ and executive function were collected in an initial screening session or from a separate study. Participants were randomised to a treatment session of compassionate imagery or a control session of relaxation. Prior to intervention, participants completed the Fears of Compassion Scales. The treatment session lasted approximately 30 minutes and questionnaires measuring empathy, relaxation, and self-compassion were administered before and after the treatment session in that order. Participants were fully debriefed following the session. The experimenter explained what the intervention was, the purpose of the study, and addressed any concerns.

Data Analysis

Data were analysed using PASW Statistics 18. Continuous data were inspected visually and Shapiro-Wilk tests were used to check for assumptions of normality. Paired-samples t-tests and Wilcoxon signed-rank tests were used to examine the effect of a single-session intervention and within-group effects. Analysis of Covariance (ANCOVA) and the Kruskal-Wallis test were used to investigate the differential effect of compassionate imagery and relaxation interventions on the outcome variables. Pearson's correlation coefficient was used to examine the effect of fear of compassion on responsiveness to intervention. Results were viewed to be statistically significant if $p < 0.05$ and effect sizes were calculated to examine the strength of relationships between variables.

Results

Demographic Variables

More than two thirds (70.8%) of the total sample fell into the three most deprived deciles compared to 46% for Greater Glasgow and Clyde (see Table 1) (Scottish Government Website, July 2011).

SIMD Deciles	Percentage of sample (n=24)	SIMD Deciles for Greater Glasgow and Clyde
1 (*most deprived)*	29.2%	22.9%
2	8.3%	13.8%
3	33.3%	9.6%
4	12.5%	7.7%
5	8.3%	7.1%
6	4.2%	6.9%
7	0	5.6%
8	4.2%	7.7%
9	0	9.0%
10 (*least deprived*)	0	9.7%

Table 1: Scottish Index of Multiple Deprivation Deciles

Data frequencies were plotted and inspected for normality of distribution and tested using the Shapiro-Wilk test (this test is deemed to be more accurate than Kolmogorov-Smirnov; Field, 2005). These analyses suggest that parametric tests were appropriate for measures of age, SDMT, deprivation, Basic Empathy and Fears of Compassion but not for age on leaving school, time since HI, verbal IQ and Balanced Emotional Empathy.

Demographic variables and screening measure results for the treatment and control group are detailed in Table 2. The groups were similar in their ratio of male to female participants. The groups did not differ significantly in age (t (22) = -1.13, p = 0.27), verbal IQ (U = 47.00, p = 0.39), time since HI (U = 57.50, p = 0.40), SIMD (t (22) = 1.02, p = 0.32) age on leaving school (U = 48.00, p = 0.14), or on the SDMT (t (18) = 1.22, p = 0.24). There were no significant differences between the groups on the pre-intervention screening measures: Basic Empathy Scale (t (22) = 0.94, p = 0.36), Balanced Emotional Empathy Scale (U = 68.00, p = 0.82), or the Fears of Compassion Scale (t (22) = -0.54, p = 0.59).

	Treatment Group	
	Compassionate Imagery	**Relaxation**
Age (M)	45.33 (15.6)	39.08 (11.08)
Gender (n): Male Female	 10 (83.33%) 2 (16.67%)	 11 (91.67%) 1 (8.33%)
Ethnicity (n): White British	 12 (100)	 12 (100)
Cause of HI (n): Road traffic accident Assault Fall	 8 (66.67%) 2 (16.67% 2 (16.67%)	 5 (41.67%) 5 (41.67%) 2 (16.67%)
Time since HI (months) (Md):	57.5 (4 – 448)	124.5 (3 – 468)
Age left school (years) (Md):	15 (14 - 16)	15.5 (14 - 17)
Verbal IQ (Md):	88.5 (84 – 107)	92 (85 – 110)[1]
SIMD (M):	1357.42 (948.19)	1845.08 (1366.58)
Symbol-Digit Modalities Test (M):[2]	25.40 (5.38)	21.90 (7.31)
Basic Empathy Scale (M):	62.17 (9.68)	59.00 (6.61)
Balanced Emotional Empathy Scale (Md):	8.5 (-42 – 25)	10 (-39 – 36)
Fears of Compassion Scale (M):	67.00 (26.56)	73.42 (31.08)

Table 2: Demographic variables for both treatment groups

Notes: M = Mean, standard deviation shown in parenthesis; Md = Median, range shown in parenthesis; n = number, proportion of group shown in parenthesis.

Experimental analyses

Data frequencies were plotted and inspected for normality of distribution and tested using the Shapiro-Wilk test. The Empathy Quotient data was normally distributed. A boxplot revealed outliers for the Self-Compassion pre-intervention and Relaxation post-intervention scale. These were further examined using z-scores, less than 5% of which had absolute values greater than 1.96 which is deemed acceptable for a normal distribution (Field, 2005). Values

[1] Two participants in the Relaxation group did not complete the WTAR: one participant became overwhelmed by the difficulty of the task and refused to continue; the other participant could reliably communicate but had difficulties reading complex language.

[2] Participants who had completed the SDMT orally were excluded from these analyses (total n=4); two in the Relaxation group and two from the Compassionate Imagery group.

of kurtosis were all less than 1.96 and values for skew all less than 2.58, apart from Relaxation post-intervention which was 2.62 but this is still below the upper threshold of 3.29. Levene's test revealed non-significant results for all the dependent variables thus homogeneity of variance is assumed. The total score was used for all of the pre and post intervention measures thereby forming continuous variables. As such, parametric statistics were deemed suitable for the Empathy Quotient analyses and non-parametric statistics were used for the Self-Compassion scale and Relaxation data analyses. Descriptive statistics pre and post-intervention for the compassionate imagery group and control condition of relaxation are presented in Table 3.

	Treatment Group	
	Compassionate Imagery	**Relaxation**
Empathy Quotient pre-intervention	11.50 (2.71)	10.08 (4.68)
Empathy Quotient post-intervention	10.42 (2.47)	10.17 (2.95)
Self-Compassion scale pre-intervention	42.00 (20 - 57)	42.00 (17 - 48)
Self-Compassion scale post-intervention	44.50 (33 - 52)	41.00 (29 - 48)
Relaxation pre-intervention	16.00 (11 - 21)	17.50 (4 - 21)
Relaxation post-intervention	16.00 (10 - 21)	20.00 (3 - 21)

Table 3: Descriptive statistics for both groups pre- and post-intervention
Notes: M = Mean, standard deviation shown in parenthesis; Md = Median, range shown in parenthesis

Is there a significant effect after a single session intervention?

The pre and post-intervention scores were compared for each outcome variable using paired-sample t-tests and Wilcoxon signed-rank tests. There was no significant effect of a single session intervention on scores on the Empathy Quotient (t (23) = 0.78 p = 0.45); Self-Compassion scale (T = 78.00, p = 0.07, r = -.26); or relaxation scale (T = 71.00, p = 0.20).

Is there a differential effect of intervention?

To investigate the effects of intervention on empathy an ANCOVA was used with the baseline score (Empathy Quotient pre-intervention) as the covariate for the outcome measure (Empathy Quotient post-intervention). There was no significant differential effect of

intervention on scores on the Empathy Quotient post-intervention ($F(1, 21) = 0.12$, $p = 0.73$). Given that the data for self-compassion and relaxation did not fulfil the criteria for parametric analyses, change scores pre to post-intervention were calculated and the Kruskal-Wallis test was used to investigate the effect of intervention for these outcome variables. There was no significant effect of intervention on scores on the Self-Compassion scale (H (1) = 0.00, p = 0.95), or relaxation scale (H (1) = 0.25, p = 0.62).

Are there within-group treatment effects?

For the compassionate imagery group there was no significant effect of intervention on scores on the Empathy Quotient (t (11) = 1.18, p = 0.13); Self-Compassion scale (T = 25.50, p = 0.14); or relaxation scale (T = 27.50, p = 0.62). Similarly, for the relaxation group there was no significant effect of intervention on scores on the Empathy Quotient (t (11) = -0.09, p = 0.93); Self-Compassion scale (T = 17.00, p = 0.15); or relaxation scale (T = 12.00, p = 0.10).

Does fear of compassion affect responsiveness to the intervention?

To consider the effect of fear of compassion on intervention the change scores between pre and post-intervention measures were calculated for the Empathy Quotient and Self-Compassion scale and correlations with the Fears of Compassion scale obtained. The data were normally distributed and hence Pearson's correlation coefficient was used. Fear of compassion did not correlate significantly with change on the Empathy Quotient (r = -0.03, p = 0.89) or Self-Compassion scale (r = 0.15, p = 0.48).

Discussion

This is the first study to investigate whether compassionate imagery could increase empathy following severe HI compared to a control condition of relaxation. A group of patients with severe HI and low empathy were identified, recruited and randomised to receive a single session of either compassionate imagery or relaxation. Scores for empathy, self-compassion, and relaxation were measured before and after the intervention.

No significant effect of a single session of compassionate imagery on empathy following severe HI was found. Although an increase in self-compassion was close to significance ($p = 0.07$), this effect was not specific to compassionate imagery treatment, and may suggest a more generic effect of interventions involving breathing techniques, relaxation and mental imagery on self-compassion. Post-hoc power calculations indicate that a total sample size of 40 participants would have been required to detect a significant change in self-compassion which is beyond the number estimated on the basis of Shapiro et al. (2007). Relaxation treatment had no effect on empathy scores. The non-significant increase in relaxation scores after relaxation treatment may be explained by high relaxation self-report scores prior to intervention creating a ceiling effect for this measure. Scores on the Fears of Compassion Scales were higher than reported norms (Gilbert et al., 2010) but did not correlate with change in either empathy or self-compassion outcome measures suggesting that a fear of compassion did not have a major influence on these scores.

Previous Literature

Compassion-focused therapy is a relatively recent development. Although studies using CFT with people with head injury have not been published there is growing support for the efficacy of CFT for people with chronic difficulties such as high levels of shame, self-criticism, and hostile auditory hallucinations (Gilbert & Irons, 2004; Gilbert & Procter, 2006; Mayhew & Gilbert, 2008). These interventions utilise a number of compassion-focussed therapeutic techniques, including compassionate imagery. The therapeutic input is often intensive with sessions lasting 1-2 hours on a weekly basis ranging from 4-12 weeks and participants are encouraged to regularly practise the techniques between sessions. Gilbert (2009) has asserted that much of the work in compassion-focused therapy is focused on addressing the resistance to becoming self-compassionate or compassionate towards others.

In the current study fear of compassion was not directly related to empathy or self-compassion however scores were still higher than reported norms. This may have made this group more resistant to compassionate imagery, and a longer and more intensive intervention focused on reducing resistance could produce different results. The therapeutic technique was novel for the research sample and repeated exposure may be necessary to aid learning and retention. People may require more time to familiarise themselves with the concepts and practise the techniques before any measurable change is found.

Rockliff, Gilbert, McEwan, Lightman and Glover (2008) investigated whether compassion-focused imagery could stimulate a soothing affect system. The results indicated that whilst some individuals did benefit, those who were higher in self-criticism with an insecure attachment style demonstrated a 'threat-like' response. They used a single-session which included the three separate conditions: relaxation imagery, compassion imagery and control imagery. A maximum of ten minutes was allocated to compassion imagery, with five minutes allocated to each of the controls. The authors noted that some participants reported 'boredom' and fatigue. The current study did not measure qualitative responses to the intervention. The research sample was largely males from the West of Scotland. The language in the compassionate imagery session focused on terms such as 'warmth', 'acceptance', and 'gentleness' and used concepts such as 'soothing breathing rhythm' and 'relaxation'. This language may have been uncomfortable for the sample or produced some resistance. Some men fear being perceived as weak if they demonstrate kind and caring attitudes (Macintosh, 1993) and this may be particularly relevant for men from areas of significant deprivation.

A further consideration is that the measures adopted in the current study may not have been sensitive to change. As mentioned above, a ceiling effect may have been present on the relaxation Likert scale measure as participants reported relatively high feelings of relaxation pre-intervention. Previous studies (Rockliff et al., 2008) measured biological factors such as cortisol level in response to compassion imagery and found significant changes. Biological factors may be more sensitive to subtle changes in affect compared to self-report measures.

The research into specific psychotherapeutic interventions following HI is limited. Previous research has examined the impact of mindfulness training on attention problems following HI. In a study by McMillan, Robertson, Brock and Chorlton (2002) 130 participants were randomly allocated to mindfulness training, physical exercise or a control group of no intervention. Participants were assessed pre and post-training and at 12 months follow up by an assessor blind to group membership. No effect of intervention was found. In contrast, Bédard et al. (2003) found that a mindfulness-based intervention improved quality of life following HI, although these results should be interpreted with some caution. This small study compared 10 people with mild-moderate HI to 3 drop-out controls. Participants were not representative of the HI population (of those completing the intervention 70% were female and the majority were educated beyond high school level).

There are a number of participant factors that need to be considered in the present research. The sample had a lower estimated pre-morbid IQ than in other studies of this population (McMillan et al., 2002), however IQ still fell within the average range so is unlikely to have affected the ability of participants to understand and respond to the intervention. The current study did not assess motivation for change. It may be that the participants did not feel a need or desire to change their attitudes or behaviour and may not have been motivated to engage with an intervention to do so. A difficulty with diminished empathy following severe HI is that the people seeking help are more frequently family and carers rather than the individual themselves, and insight in the person with HI can often be an issue (Koskinen, 1998). It may be that having insight into their difficulties will facilitate an active attempt to change. Most studies using compassion focused therapy have used participants who want treatment and are seeking change in their lives (Gilbert & Irons, 2004; Gilbert & Procter, 2006).

Brain injury can result in a number of difficulties including deficits in attention, concentration and memory, and irritability and fatigue (McMillan et al., 2002). The treatment intervention in the current study required sustained attention for a minimum of 30 minutes. In addition participants were asked to complete three questionnaires pre- and post intervention. Whilst the questionnaires were designed to be as brief as possible, the demand on attention and concentration may have caused feelings of irritability and resulted in lower empathic responding.

Any locus of the brain injury may also have an effect. Recent neuro-imaging research has found that the meditative practice of compassion for others was associated with activation of the limbic regions of the brain (Lutz, Brefczynski-Lewis, Johnstone & Davidson, 2008). Similarly, a study by Longe et al. (2010) found that the regions of the brain that were activated during self-reassurance were similar to those involved in expressing compassion and empathy towards others. The extent of damage to these areas of the brain is likely to determine individual capacity for self-compassion and empathy towards others, although for many people with severe HI focal damage to the brain is not detectable on CT or MRI brain scans (Bigler, 2001).

Strengths/ Limitations of this study

The size of the study is similar to those published for other therapeutic interventions in head-injured subjects (Vas, Chapman, Cook, Elliott & Keebler, 2011; Goverover, Johnston, Toglia & Deluca, 2007). The groups were well matched on demographic variables and screening measure scores which allowed for valid comparisons between the groups. The ratio of male to female participants and cause of HI was similar to other studies involving a severe head injury group (Thornhill, et al., 2000; Sumpter & McMillan, 2006; Majdan, et al., 2011) thereby suggesting that the sample in the current study was representative of the population. The sample was disproportionately deprived relative to the population of greater Glasgow and Clyde. This is not unusual as people who have experienced severe HI are often denoted by higher deprivation scores (Dunn, Henry & Beard, 2003). Treatment condition was randomly allocated and a treatment script was used to ensure each participant received a standard intervention. All of the participants who were recruited completed the study protocol.

The mean IQ (92) in the current sample is lower than that reported in other studies using mindfulness-based interventions with HI groups (McMillan et al., 2002 (mean IQ =101)), however it is within the average range of the general population so is unlikely to have affected the ability of the sample to understand and respond to the intervention.

The current research did not include a qualitative component and therefore individual perceptions of the treatment and control conditions are unknown. Brief interventions using

compassionate imagery have produced promising results (Rockliff et al., 2008). Factors specific to a severe HI sample such as deficits in attention, insight, motivation, and fear of compassion need to be addressed in future research.

Implications for future research

Of the initial sample screened more than half (55%) had low empathy. Given the problems associated with low empathy these numbers are concerning and further research into interventions to remediate these difficulties is needed. Whilst the current study did not find an effect of a single session of compassionate imagery on empathy, there was a non-significant improvement in self-compassion. It is possible that therapeutic intervention over a number of sessions may be beneficial in training HI participants in the techniques of compassionate imagery and would allow time to work through any resistance to the approach. Motivation for change may be an important factor and warrants further investigation. Qualitative research could examine individual experiences of the intervention and could highlight any areas for modification such as simplification or alteration of the language used which could make the intervention more culturally acceptable.

Conclusions

Whilst the current study did not find an effect of a single session of compassionate imagery on empathy, an increase in self-compassion across both groups approached significance. The study was well-controlled and the sample was representative of the population, however brief intervention time may have limited the findings. Further research is warranted to determine if an intervention that takes into account HI factors or is of greater duration would be beneficial.

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CHAPTER THREE:
ADVANCED PRACTICE I REFLECTIVE CRITICAL ACCOUNT

Improving access: for better or worse?

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Submitted in partial fulfilment of the requirements for the degree of Doctorate in Clinical Psychology (D.Clin.Psy).

Abstract:

Introduction:

The mental health of the population is vital to ensure a healthy and productive workforce. A number of initiatives to increase access to psychological therapies have been developed and the government has recently established a HEAT target to reduce waiting times for psychological therapies. In my third year placement I have worked within an adult mental health service where assessment clinics are used as a means of increasing access to psychological therapies and reducing waiting times. My experience of working within this system has led me to reflect on whether we are adopting a medical model of treatment to meet government targets and if our skills as clinical psychologists are being sacrificed as a result.

Reflection:

The model of reflective practice by Atkins and Murphy (1993) was used to structure the account. This model synthesises a number of widely used reflective models and identifies the key stages of reflection. I described how it felt to observe and take part in the assessment clinic. I then analysed the emotional level of experience and examined this in the context of existing and new knowledge. A new perspective was developed and key learning points identified. The impact of this on future practice and professional development is considered.

Reflective Review:

This reflective account is based on reflection-on-action. Future reflective practice may benefit from a combination of reflection-in-action and reflection-on-action approaches. Writing the reflective account was a constructive approach to examining a range of emotions and helped me use the knowledge I had gained to consider how I would approach similar situations in the future. Establishing a reflective practice group in the future would encourage regular reflective practice.

CHAPTER FOUR:
ADVANCED PRACTICE II REFLECTIVE CRITICAL ACCOUNT

Branded for life? A reflection on inpatient psychiatric care for children.

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Abstract:

Introduction:

In 'Delivering for Mental Health' (2006) the Scottish Government proposed to improve the mental health services being offered to children. Early intervention in this population is based on the premise that if we can target mental health problems as soon as they develop we can reduce their likelihood of re-occurrence in the future (Nicholas & Broadstock, 1999). My final placement has been based within a child psychiatric inpatient unit. This experience has led me to reflect on the value of inpatient settings and the potential future repercussions for individuals of childhood psychiatric inpatient admissions. The wider social and political context is examined and consideration is given to the future development of clinical psychology as a profession and my role within this.

Reflection:

I have previously found the model by Atkins and Murphy (1993) to be helpful in my reflective practice and decided to use this to structure the account. This model summarises previous research in the area and identifies three key stages of reflection. I described my experience of starting a new placement in a psychiatric inpatient unit for children. I then examined my feelings in relation to this experience and considered this in the context of existing and new knowledge. A new perspective was developed and key learning points identified. The impact of this on future practice and professional development is considered.

Reflective Review:

Future reflective practice may benefit from increasing knowledge of a wider variety of reflective models to provide a diversity of approaches to reflection.

I have reflected on the development of my skills over the past three years and have noticed that I am using reflective practice much more frequently now compared to previously in order to process and learn from my experiences. Establishing a multi-professional reflective practice group in the future would enrich my reflective practice.

Appendix 1.1 – Methodological Criteria for Appraisal of Studies (Based on SIGN, 2004)

QUALITY ASSESSMENT CHECKLIST	
Study identification (author, title, year of publication, journal title)	
Checklist completed by:	
Score '1' if met, '0' if not met or not stated.	
1. The study addresses an appropriate and clearly focused question.	
2. The location of recruitment is stated.	
3. A control or comparison group is used.	
4. The assignment of participants to treatment groups is randomised.	
5. Groups are matched on key characteristics where possible.	
6. The treatment and control groups are similar at the start of the trial (on at least two key characteristics of age, gender, severity of injury, time since injury, level of education).	
7. The study has a 'no-treatment' or 'treatment-as-usual' control group (to control for spontaneous recovery effects).	
8. Inclusion/exclusion criteria are stated.	
9. Total sample size is > 20.	
10. Total sample size is > 40.	
11. Investigators assessing outcomes are kept 'blind' about treatment allocation.	
12. At least one primary outcome measure is a standardised assessment tool.	
13. The severity of brain injury is specified.	
14. The method of diagnosis is appropriate (medical professional, Glasgow Coma Scale (GCS), Post-Traumatic Amnesia (PTA), loss of consciousness, neuro-imaging).	
15. Brain injury occurred at least 6 months ago.	
16. Cognitive deficits are appropriately assessed and related to treatment.	
17. Follow-up data are collected (if not applicable due to no significant findings score '1')	
18. The intervention is adequately described or a manual is used.	
19. A power calculation is used or the sample size is justified.	
20. The analysis is appropriate to the design and type of outcome measure.	
21. All the subjects are analysed post-intervention in the groups to which they were allocated (referred to as intention to treat analysis).	
22. Adequate information on drop-outs is provided (if not applicable score '1').	
23. Data from the main analyses are clearly reported (including p-values).	
24. Corrections for multiple comparisons are made (if not applicable score '1').	
25. Effect sizes were calculated.	
26. There was sufficient information to calculate effect sizes (means, standard deviations, F-values)	
Total Quality Rating	**/26**
Quality Rating: High (≥ 70%), Moderate (50 – 69%), or Low (≤ 49%).	**%**

Appendix 1.2 Guidelines for submission to *Neuropsychological Rehabilitation*

SUBMISSION OF MANUSCRIPTS:

Please email your paper to the editorial assistant, saved in a standard document format type such as Word or PDF, at reviews@psypress.co.uk. You may also contact the Editorial Assistant by phone on 02070 177730.

Your covering email must include full contact details (including email), the title of the journal to which you are submitting, and the title of your article. There is no word limit for papers submitted to this journal.

All manuscripts must be accompanied by a statement confirming that it has not been previously published elsewhere and that it has not been submitted simultaneously for publication elsewhere.

Authors will normally receive a decision on their papers within three months of receipt, and if accepted they will normally be published six to nine months later. The date of receipt of the manuscript will be printed. Where minor revision of a paper is requested the original date of receipt will appear, provided that a satisfactory revision is received within one month of the request. Otherwise it will bear the revised version date.

Journal Production Editor: authorqueries@tandf.co.uk

Ethics and Consent Standards

Disclosure of Conflicts of Interest

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FORMAT

Typescripts. The style and format of the typescripts should conform to the specifications given in the *Publication Manual of the American Psychological Association* (6th ed.). Typescripts should be **double spaced** with adequate margins, and numbered throughout. The title page of an article should contain only:

(1) the title of the paper, the name(s) and address(es) of the author(s);
(2) a short title not exceeding 40 letters and spaces, which will be used for page headlines;
(3) name and address of the author to whom correspondence and proofs should be sent;

(4) your telephone, fax and e-mail numbers, as this helps speed of processing considerably.
(5) 3-5 keywords

Abstract. An abstract of 50-200 words should follow the title page on a separate page.

Headings. Indicate headings and subheadings for different sections of the paper clearly. Do not number headings.

Acknowledgements. These should be as brief as possible and typed on a separate page at the beginning of the text.

Permission to quote. Any direct quotation, regardless of length, must be accompanied by a reference citation that includes a page number. Any quote over six manuscript lines should have formal written permission to quote from the copyright owner. It is the author's responsibility to determine whether permission is required from the copyright owner and, if so, to obtain it. (See "Seeking permission to use other sources" for a template letter to use when seeking copyright permission.)

Footnotes. These should be avoided unless absolutely necessary. Essential footnotes should be indicated by superscript figures in the text and collected on a separate page at the end of the manuscript.

References:

Reference citations within the text. Use authors' last names, with the year of publication, e.g., "(Brown, 1982; Jones & Smith, 1987; White, Johnson, & Thomas, 1990)". On first citation of references with **three to five** authors, give all names in full, thereafter use [first author] "et al.". In the references, the first **six** authors should be listed in full.

If more than one article by the same author(s) in the same year is cited, the letters a, b, c, etc., should follow the year. If a paper is in preparation, submitted, or under review, the reference should include the authors, the title, and the year of the draft (the paper should also be cited throughout the paper using the year of the draft). Manuscripts that are "in press" should also include the publisher or journal, and should substitute "in press" for the date.

Reference list. A full list of references quoted in the text should be given at the end of the paper in alphabetical order of authors' surnames (or chronologically for a group of references by the same authors), commencing as a new page, typed double spaced. Titles of journals and books should be given in full, e.g.:

Books:
Rayner, E., Joyce, A., Rose, J., Twyman, M., & Clulow, C. (2008). *Human development: An introduction to the psychodynamics of growth, maturity and ageing* (4th ed.). Hove, UK: Routledge.

Chapter in edited book:
Craik, F. I. M., Naveh-Benjamin, M., & Anderson, N. D. (1998). Encoding processes: Similarities and differences. In M. A. Conway, S. E. Gathercole, & C. Cornoldi (Eds.),

Theories of memory (Vol. 2, pp. 61–86). Hove, UK: Psychology Press.

Journal article:
Adlington, R. L., Laws, K. R., & Gale, T. M. (2009). The Hatfield Image Test (HIT): A new picture test and norms for experimental and clinical use. *Journal of Clinical and Experimental Neuropsychology, 31,* 731-753. doi:10.1080/13803390802488103

Tables. These should be kept to the minimum. Each table should be typed double spaced on a separate page, giving the heading, e.g., "Table 2", in Arabic numerals, followed by the legend, followed by the table. Make sure that appropriate units are given. Instructions for placing the table should be given in parentheses in the text, e.g., "(Table 2 about here)".

Figures.
Figures should only be used when essential and the same data should not be presented both as a figure and in a table. Where possible, related diagrams should be grouped together to form a single figure. Each figure should be on a separate page, not integrated with the text. The figure captions should be typed in a separate section, headed, e.g., "Figure 2", in Arabic numerals. Instructions for placing the figure should be given in parentheses in the text, e.g., "(Figure 2 about here)".

For more detailed guidelines see Preparation of Figure Artwork.

Statistics. Results of statistical tests should be given in the following form:

"... results showed an effect of group, $F(2, 21) = 13.74$, $MSE = 451.98$, $p < .001$, but there was no effect of repeated trials, $F(5, 105) = 1.44$, $MSE = 17.70$, and no interaction, $F(10, 105) = 1.34$, $MSE = 17.70$."

Other tests should be reported in a similar manner to the above example of an *F*-ratio. For a fuller explanation of statistical presentation, see the *APA Publication Manual* (6th ed.).

Abbreviations. Abbreviations that are specific to a particular manuscript or to a very specific area of research should be avoided, and authors will be asked to spell out in full any such abbreviations throughout the text. Standard abbreviations such as RT for reaction time, SOA for stimulus onset asynchrony or other standard abbreviations that will be readily understood by readers of the journal are acceptable. Experimental conditions should be named in full, except in tables and figures.

Appendix 2.1

Can deficits in empathy after head injury be improved by compassionate imagery?

Major Research Project Proposal

Date	16/02/11
Word Count	2,665
Version Number	2

Title

Can deficits in empathy after head injury be improved by compassionate imagery?

Background

Each year in the UK, over 1 million people will attend hospital as a result of an acquired brain injury, of which 100,000 are left with significant disability (Headway, 2009). The incidence of head injury (HI) is higher amongst males and individuals living in areas characterised by socioeconomic deprivation. There is a bimodal peak incidence of HI in people aged 15-24 and over 70. The most common causes of HI in younger people are road traffic accidents and assaults, whilst in the elderly it is falls (Deb & Burns, 2007).

The significance of HI can be underestimated. There is often a good physical recovery whereas cognitive and emotional problems may not be immediately obvious (Prigatano, 1999). HI can have a significant impact on empathy and cognitive functioning, resulting in disinhibition, aggression, irritability and impairments in executive function, including memory, attention, impulsivity and speed of processing (Howitt, 2002). These difficulties are particularly common following severe HI (Lippert-Grüner et al., 2006).

Personality changes are often cited by friends and family as the most difficult aspect of HI to cope with, in particular aggression, social disinhibition, impulsivity, and a lack of empathy. In some cases the effects are short term and disappear as the individual recovers, however when brain injury is more severe the changes can appear to be permanent. This can have a significant effect on interpersonal relationships; the reported rates of marital breakdown five years after severe HI range from 42% - 78% (Thomsen, 1984; Wood & Yurdakul, 1997). Empathy is considered to be vital in effective interpersonal relationships (Davis & Gold, 2011), and deficits in empathy are thought to be common after head injury (Williams & Wood, 2010). Empathy has been viewed within a social cognition framework, which is composed of both a cognitive process and an affective ability. Fundamental to the former are likely to be cognitive flexibility, perspective taking and role-taking, and emotional sensitivity and responsiveness to the latter (Eslinger, 1998). There is some evidence to support a view that brain injury is associated with both lower cognitive and affective measures of empathy; Shamay-Tsoory, et al. (2004) found that patients with prefrontal lesions were impaired in both cognitive and affective empathy compared to patients with parietal lesions and healthy

controls. This may be complicated with different combinations of reduced affective and cognitive empathy associated with different areas of prefrontal lesions (Eslinger, 1998). Furthermore, a small percentage of people may exhibit an increase in empathic responding after cerebral damage; Eslinger (1998) found that 5% of his sample of patients with HI demonstrated heightened sensitivity to the emotional states of others. Empathy influences behaviour, i.e. those with high empathy should behave in a more responsive way to the perceived feelings of another. Kaukiainen et al. (1999) found that empathy (cognitive and affective combined) was negatively correlated with aggression. HI can result in problems in the ability to empathise (Eslinger, 1998), however it is unclear whether these changes are permanent or if it is an ability which has been 'damaged' and could be repaired.

Most research on psychological interventions following HI is aimed at the relatively small proportion of cases with challenging behaviour (Rothwell et al., 1999). Research on other forms of therapy that encompass the cognitive and emotional aspects of functioning is limited and findings are mixed (Anson & Ponsford, 2006; Rees et al., 2007; and Kinney, 2001). There has been interest in mindfulness-based approaches for development of empathy more generally outwith the area of brain injury. The aim is to improve perspective taking and empathic concern; the hypothesis being that a skill in non-judgementally processing information in the current moment (Block-Lerner et al., 2007) is effective when applied to mental health difficulties such as recurrent depression, anxiety, shame and low self-esteem (Teasdale et al., 2000; Gilbert & Procter, 2006), and in turn can aid interpersonal functioning (Neff, 2006). Psychological therapy when applied in this way can ease distress and suffering. The research in this area has largely focused on adult populations with intact cognitive functioning and there is little research about the effectiveness of psychological therapies when applied to adults with brain injury.

Compassionate Mind Training (CMT) (for further information see Appendix A) is a compassion-based therapeutic approach developed by Gilbert and Proctor (2006). CMT seeks to alter a person's whole orientation to self and relationships by utilising these competencies for self-to-self relating. Compassionate imagery is a therapeutic technique that is often used within CMT. For centuries within Buddhist healing practices, developing compassion for self and others has involved using structured compassionate images that are

practised regularly. There is evidence to suggest that the use of compassionate imagery can stimulate feelings of compassion. Gilbert and Irons (2004) found that the use of compassionate images enabled self-critical people to self-soothe. Images can have powerful emotional effects and may alter how an individual relates to themselves and others. Progressive Muscle Relaxation (PMR) (Jacobson, 1938) has been successfully applied in the treatment of anxiety disorders. PMR aims to reduce muscle tension and in turn inhibit the generation of unhelpful thoughts and emotions (Conrad & Roth, 2007). PMR is often included as a component of anger treatment programmes for people with brain injury (Demark & Gemeinhardt, 2002); however there is no evidence to suggest that PMR could target aspects of personality, such as empathy, in this population.

This pilot study will investigate whether compassionate imagery can increase empathy in individuals with HI compared to a control group receiving relaxation.

Aims and Hypotheses

Aims

This pilot study will investigate whether a single session of compassionate imagery can increase the capacity to empathise after severe head injury.

Research Questions

Can compassionate imagery improve empathy in individuals after a severe head injury?

Hypothesis

A greater increase in empathy will arise from compassionate imagery than from relaxation in individuals with a severe head injury.

Design

A between-group repeated measures design will be used to compare differences in empathy before and after a treatment session of compassionate imagery or relaxation.

Plan of Investigation

This is a pilot study that is linked to a research project which has already been granted NHS Ethics Committee approval. Within this separate study participants with severe head injury will complete measures of empathy and executive function. Should participants identified as having low empathy consent to participating in the current research, access will be granted to their baseline measure results. The current research employs a between-subjects repeated measures design. Pseudo-randomisation would be used to allocate participants to a treatment session of Compassionate Imagery or a control group of Relaxation. Pre- and post-intervention measures would be self-report. Participants would be debriefed at the end of the study.

Participants

The sample will be adults with a history of severe HI recruited from services across the West of Scotland. They will have low empathy as identified in a recent, separate study on empathy.

Inclusion and Exclusion Criteria

Inclusion

- Aged between 18 and 65 years old
- Male or female
- Severe brain injury as measured by post traumatic amnesia (PTA) of more than one day.
- Head injury at least three months prior to date of testing
- Low empathy, defined by scores 1sd below average on the Basic Empathy Scale (Table 1) or the Balanced Emotional Empathy Scale (total score of less than 23) (Mehrabian, 1996).

Table 1: Cut-off scores on the Basic Empathy Scale for inclusion in the present research

Mean scores	Males	Females
Cognitive empathy	< 27.1	< 31.1
Affective empathy	< 25.6	< 34.5
Total score	< 54.5	< 67

Exclusion

- Unable to consent
- Current diagnosis of deteriorating neurological condition
- Current psychiatric difficulties
- Learning disability
- Being treated for ongoing alcohol and/or drugs problem
- Vision or hearing impairment
- Severe aphasia or dyslexia

Recruitment Procedures

Participants would be recruited from Headway in Glasgow, Ayrshire, North Lanarkshire and South Lanarkshire; PDRU at the Southern General Hospital; Brain Injury Assessment Service; Social Services Brain Injury service in West Dunbartonshire; and inpatient units in Glasgow including Graham Anderson House. Contact would be made with the clinics to provide information about the research study. As part of a separate study on empathy participants who are identified as having low empathy will have been asked if they would be interested in taking part in the current research. If so, their details would be passed to staff at the head injury unit that they attend who would then contact the researcher. Participants who consent to take part in the research would be contacted. They would be provided with an information sheet and written consent form. The participant would be informed that if they consent to take part in the research their GP would be informed. The researcher would answer any questions they may have and would arrange a time to meet for testing.

Measures

Demographic data would be recorded, (age, ethnicity, education, and postcode). Deprivation rank would be derived from postcodes using the Scottish Index of Multiple Deprivation (Scottish Executive, 2006). Severe HI will be classified as self-reported post-traumatic amnesia (PTA) of more than one day, at least 3 months prior to the date of testing. The WTAR would provide a measure of pre-morbid I.Q. Measures of empathy, self-compassion, fear of compassion, relaxation, and executive function would be administered. The measures are detailed below:

Measures taken prior to intervention as part of a separate study:

8. Basic Empathy Scale (Jolliffe & Farrington, 2006). This provides a measure of self-reported empathy. The authors suggest that it would be useful to compare the Basic Empathy Scale with measures of intelligence and executive function to determine the relationship to empathy. Separate scores for cognitive and affective empathy will be calculated.
9. Balanced Emotional Empathy Scale (Mehrabian, 2000). This test is a measure of emotional or affective empathy. It is a 30 item self-report measure of the ability to vicariously experience another individual's emotions. Emotional empathy reflects positive interpersonal relationships and is negatively related to interpersonal violence.
10. The Symbol-Digit Modalities Test. This provides a measure of executive function by requiring attention, visual scanning and motor and psychomotor speed. It is used as a screening tool for cerebral dysfunction due to its sensitivity in detecting brain damage. The test allows written or verbal responding (Western Psychological Services Website, 17.05.10).

Measure to be administered prior to intervention

11. Fears of Compassion Scales (Gilbert et al., 2010). These three scales measure fears of: compassion for others (10 items), compassion from others (13 items), and compassion from self (15 items). The items are rated on a 5-point Likert scale (0 = Don't agree at all, 4 = Completely agree). A fear of compassion may inhibit the capacity of compassionate imagery to increase self-compassion and empathy. These scales will be administered prior to the treatment session and will act as a covariate measure.

Measures to be administered pre- and post- intervention

12. The Self-Compassion Scale (Neff, 2003). This scale measures the degree to which individuals display self-kindness against self-judgement, common humanity versus isolation, and mindfulness versus over-identification. The total self-compassion score will be used. This scale will be split and balanced, with half of the items given pre- and half post-intervention. Self-compassion is expected to increase following the Compassionate Imagery session.

13. The Empathy Quotient (Baron-Cohen & Wheelwright, 2004). This self-report questionnaire contains 60 items; 40 empathy items and 20 control items. 'Empathy' in this scale is composed of combined cognitive and affective components. The total empathy quotient score will be used. This scale will be split and balanced, with half of the items given pre and half post intervention. Empathy is expected to increase following the Compassionate Imagery session.
14. Relaxation measure. Participants will complete a self-report Likert scale measure of relaxation before and after the intervention (Appendix B). Feelings of relaxation are expected to increase following the Relaxation session. Relaxation may also increase in the group receiving Compassionate Imagery as this intervention also involves aspects of controlled breathing and simple relaxation techniques.

Research Procedures

Information on demographics, history of head injury and baseline measures of empathy, pre-morbid IQ and executive function would be collected from a separate study. Participants in the current research would be pseudo-randomised to a treatment session of Compassionate Imagery or a control group receiving Relaxation. Pseudo-randomisation would ensure that groups are matched for empathy scores where possible. Prior to intervention, participants would complete the Fears of Compassion Scales. The treatment session would last approximately 40 minutes and questionnaires measuring self-compassion, empathy, and relaxation would be administered before and after the treatment session. Data would anonymised and stored in a secure location.

Intervention

The treatment session scripts can be found in Appendices C and D.

Sample size estimation

The required sample size is difficult to calculate because there are no published studies of this kind. However, previous literature has shown that the Self-Compassion Scale can reliably differentiate between performance pre- and post- treatment intervention. A study by Shapiro et al. (2007) compared performance on the Self-Compassion Scale before and after an 8-week Mindfulness-Based Stress Reduction intervention. Using data from this study (mean score

pre-intervention=18.06, SD = 3.97; mean score post-intervention=20.92, SD = 3.84), the effect size was large (dz = 0.73), resulting in a power of 1.0 (dz is the Cohen effect size for a repeated measures design).

For the purpose of this pilot study a more conservative effect size may be adequate. However the study will use groups that are demographically well-matched, potentially increasing the power, compared to Shapiro et al. (2007) whose treatment and control group differed significantly in terms of academic year. With 80% power to detect a large effect size (dz = 0.8) and alpha set at .05, it is estimated that 7 people per group are required. For a medium effect size (dz =0.5) with power at 0.8, and alpha set at .05, it is estimated that 14 people per group are required (G*Power 3; Faul, et al., 2007). In order to detect a medium-large effect size it is predicted that two groups of 10 will need to be recruited (total n=20). Post-hoc effect size calculations will be performed where possible to inform future research in this area.

Settings and Equipment

Requirements include a consulting room within the testing venue.

Data Analysis

Prior to formal data analysis, the data would be checked to ensure they meet the assumptions for parametric statistical analysis. If not, then non-parametric statistical tests would be used. Between-group analyses would examine differences in empathy, self-compassion, and relaxation before and after receiving a treatment session of Compassionate Imagery or Relaxation and would investigate if fear of compassion acted as a covariate. A repeated measures ANCOVA would be used to measure the effect of the intervention. Descriptive analyses would examine the demographics of the sample.

Health and Safety Issues

Researcher Safety Issues

Participants would be seen in a staffed facility where there are formal procedures in place to minimise risk.

Participant Safety Issues

We do not envisage any participant safety issues. Participants would be informed that they can withdraw from the research at any point and would be debriefed following the treatment session.

Ethics Issues

Ethics approval would be sought from the local NHS Ethics Committee.

Financial Issues

Costs relate to paper, envelopes and photocopying and are detailed on the research expenses form.

Timetable

2011

February	Submit proposal to the NHS Ethics Committee. Amendments to proposal in accordance with Ethics Committee recommendations.
March	Information, questionnaires and consent forms will be distributed to individuals according to inclusion criteria. Contact will be established with participants consenting to take part in the research study and appointments arranged for data collection.
March – May 2011	Data collection.
May	Data analysis.
June	Drafts written and amended.
July	Finalise report and submit.

Practical Applications

The application of compassion focussed therapy to head injured individuals who lack empathy. This could become part of regular therapy for individuals with head injury. If empathy can be improved, interpersonal relationships and social interactions could benefit, thereby improving quality of life.

References

All references are included in the MRP Project Paper (Chapter Two).

Appendix 2.2

Compassionate Mind Training information

Compassion has been defined as "a basic kindness, with a deep awareness of the suffering of oneself and of other living things, coupled with the wish and effort to relieve it" (Gilbert, 2010) and is seen as a multifarious process (Gilbert & Procter, 2006).

Compassion is the ability to care for others through evolved motivational, emotional and cognitive-behavioural competencies. It involves a number of abilities including the desire to care for the well-being of another, distress sensitivity/recognition, sympathy, distress tolerance, empathy, and non-judgement. Problems in any one aspect can make compassion difficult. Compassionate Mind Training (CMT) is a compassion-based therapeutic approach developed by Gilbert and Proctor (2006). CMT seeks to alter a person's whole orientation to self and relationships by utilising these competencies for self-to-self relating. Self-empathy is the ability to perceive and understand our own thoughts and feelings (Gilbert, 2009). Through training it is hoped that compassion processes will bear a retrieval advantage over an internalised attacking style. Gilbert (2005) has proposed that self-compassion deactivates the threat system (associated with feelings of insecurity and defensiveness) and activates the soothing system (associated with feelings of secure attachment and safety). The process of self-soothing is thought to engender greater capacities for intimacy, affect regulation, exploration and successful coping with the environment (Gilbert, 1989).

CMT is typically prescribed for individuals who have high levels of shame and self-criticism as these individuals can find it difficult to generate feelings of contentment, safeness or warmth in their relationships with others and themselves (Gilbert, 2009). Problems of shame and self-criticism are often rooted in histories of abuse, bullying and neglect. CMT involves creating feelings of warmth, kindness and support in a range of activities which are multimodal and common to other psychotherapies. People can be taught to engage mindfully with a range of therapeutic interventions that focus on thoughts, feelings and behaviours (Williams, Teasdale & Segal, 2007). Many clients struggle to access the self-soothing system that underpins compassion. In fact, much of the process of CMT involves addressing resistance to becoming self-compassionate or compassionate to others. For some, the

beginning of the experience of warmth and safety in therapy can cause considerable sadness and grief. It is the role of the therapist to normalise, contain and work with these feelings.

Gilbert and Procter (2006) found that in a sample of individuals with chronic difficulties and high self-criticism CMT applied in a group therapy approach reduced depression and anxiety and increased self-soothing abilities. The Self-Compassion Scale was developed by Kristin Neff (2003) and research has found that higher self-compassion is associated with greater psychological well-being: less depression and anxiety with greater life satisfaction and social relatedness. Much of the research using the Self-Compassion Scale has been carried out on non-clinical populations (Neff, Kirkpatrick & Rude, 2007a; Neff, Rude & Kirkpatrick, 2007b; Thompson & Waltz, 2008). Thompson and Waltz (2008) found that high self-compassion was associated with less avoidance strategies following trauma exposure. A recent study by Kelly, Zuroff, Foa and Gilbert (2010) found that a self-compassion intervention helped reduce daily smoking more quickly than a baseline self-monitoring condition. This intervention, which was based on CMT and compassion-focused therapy, was found to be most beneficial for individuals who were low in readiness to change and had high self-criticism.

Whilst there is evidence to suggest that self-compassion benefits the self, there are also indications that self-compassion also benefits others within interpersonal relationships. Neff (2006) found that self-compassionate individuals were described by their partners as being more emotionally connected and less aggressive and controlling. Of particular interest is whether compassionate people are more compassionate towards others. Preliminary findings suggest that the link between self-compassion and other-focused concern is mixed. Neff and McGehee (2008) found that self-compassionate individuals reported a greater tendency to forgive others and be more likely to take their perspective, however there was no significant link to empathy for others. This study used a non-clinical population which may not be representative of the wider population, and relied heavily on self-report measures. It is evident that the link between self-compassion and empathy requires further research, particularly using clinical populations such as people with a history of HI as this is where deficits of empathy can be expected.

CMT is designed to have a soothing effect on the threat protection system and help individuals develop a kinder way of relating to themselves. Could self-compassion be a precursor to empathic responding?

Appendix 2.3

WoSRES
West of Scotland Research Ethics Service

NHS Greater Glasgow and Clyde

West of Scotland REC 2
Western Infirmary
Ground floor, Tennent Building
38 Church Street
Glasgow
G11 6NT
e-mail: evelyn.jackson@ggc.scot.nhs.uk
Telephone: 0141-211-1722
Facsimile: 0141-211-1847

18 April 2011

Professor Tom McMillan
Professor of Clinical Neuropsychology
University of Glasgow
Mental Health and Wellbeing
Gartnavel Royal Hospital
1055 Great Western Road
Glasgow
G12 0XH

Dear Professor McMillan

Study title:	**Can deficits in empathy after head injury be improved by compassionate imagery?**
REC reference:	**11/AL/0119**

Thank you for your letter of 26 March 2011, responding to the Committee's request for further information on the above research and submitting revised and submitting revised documentation.

The further information was considered in correspondence by a sub-committee of the REC in correspondence. A list of the sub-committee members is attached.

Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation, as revised, subject to the conditions specified below.

Ethical review of research sites

NHS sites

The favourable opinion applies to all NHS sites taking part in the study, subject to management permission being obtained from the NHS/HSC R&D office prior to the start of the study (see "Conditions of the favourable opinion" below).

Conditions of the favourable opinion

The favourable opinion is subject to the following conditions being met prior to the start of the study.

Management permission or approval must be obtained from each host organisation prior to the start of the study at the site concerned.

Management permission ("R&D approval") should be sought from all NHS organisations involved in the study in accordance with NHS research governance arrangements.

Guidance on applying for NHS permission for research is available in the Integrated Research Application System or at http://www.rdforum.nhs.uk.

Where a NHS organisation's role in the study is limited to identifying and referring potential participants to research sites ("participant identification centre"), guidance should be sought from the R&D office on the information it requires to give permission for this activity.

For non-NHS sites, site management permission should be obtained in accordance with the procedures of the relevant host organisation.

Sponsors are not required to notify the Committee of approvals from host organisations

It is the responsibility of the sponsor to ensure that all the conditions are complied with before the start of the study or its initiation at a particular site (as applicable).

Approved documents

The final list of documents reviewed and approved by the Committee is as follows:

Document	Version	Date
Protocol	2	21 February 2011
GP/Consultant Information Sheets	1	31 January 2011
GP/Consultant Information Sheets	2	16 March 2011
Response to Request for Further Information	-	26 March 2011
REC application	-	17 February 2011
Participant Consent Form	1	31 January 2011
Participant Consent Form	2	16 March 2011
Questionnaire: Self-Compassion Scale	-	-
Questionnaire: Fears of Compassion Scales	-	-
Questionnaire: Basic Empathy Scale	-	-
Questionnaire: Balanced Emotional Empathy Scale	-	-
Letter from Dr Sue Turnbull, University of Glasgow	-	10 February 2011
Participant Information Sheet	1	31 January 2011
Participant Information Sheet	2	16 March 2011
Questionnaire: Relaxation Likert Scale	1	21 February 2011
Questionnaire: The Empathy Quotient	-	-
Investigator CV	-	01 January 2011
Letter from Professor T McMillan, University of Glasgow	-	10 February 2011
Mari K O'Neill's CV	-	21 January 2011

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees (July 2001) and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

After ethical review

Now that you have completed the application process please visit the National Research Ethics Service website > After Review

You are invited to give your view of the service that you have received from the National Research Ethics Service and the application procedure. If you wish to make your views known please use the feedback form available on the website.

The attached document *"After ethical review – guidance for researchers"* gives detailed guidance on reporting requirements for studies with a favourable opinion, including:

- Notifying substantial amendments
- Adding new sites and investigators
- Progress and safety reports
- Notifying the end of the study

The NRES website also provides guidance on these topics, which is updated in the light of changes in reporting requirements or procedures.

We would also like to inform you that we consult regularly with stakeholders to improve our service. If you would like to join our Reference Group please email referencegroup@nres.npsa.nhs.uk.

11/AL/0119	**Please quote this number on all correspondence**

With the Committee's best wishes for the success of this project.

Yours sincerely

Evelyn Jackson

for **Dr S Langridge**
Chair

Enclosures: List of names and professions of members who were present at the meeting
"After ethical review – guidance for researchers"

Copy to: Dr Erica Packard, R&D Office, Tennent Building, Western Infirmary
Miss M O'Neill

West of Scotland REC 2

Attendance at Sub-Committee of the REC meeting on 15 April 2011

Committee Members:

Name	Profession	Present	Notes
Dr S Langridge (Chair)	General Practitioner	Yes	
Dr David Shaw	Lecturer in Ethics & Law	Yes	
Dr Jesse Dawson	Clinical Lecturer in Medicine	Yes	
Mr Stuart Milligan	Lecturer in Palliative and Cancer Care		

Appendix 2.4

Coordinator/Administrator: Dr Erica Packard/Ms Elaine O'Donnell
Telephone Number: 0141 211 6208
E-Mail: erica.packard@ggc.scot.nhs.uk
Website: www.nhsggc.org.uk/r&d

R&D Management Office
Western Infirmary
Tennent Institute
1st Floor 38 Church Street
Glasgow, G11 6NT,

3 May 2011

Miss Mari O'Neill
Trainee Clinical Psychologist
Mental Health and Wellbeing
Gartnavel Royal Hospital
1055 Great Western Road
Glasgow G12 0XH

NHS GG&C Board Approval

Dear Miss O'Neill,

Study Title:	**Can deficits in empathy after head injury be improved by compassionate imagery?**
Principal Investigator:	**Miss Mari O'Neill**
GG&C HB site	**Southern General Hospital**
Sponsor	**NHS Greater Glasgow and Clyde**
R&D reference:	**GN11CP073**
REC reference:	**11/AL/0119**
Protocol no: (including version and date)	**V2; 21/02/11**

I am pleased to confirm that Greater Glasgow & Clyde Health Board is now able to grant **Approval** for the above study.

Conditions of Approval

1. **For Clinical Trials** as defined by the Medicines for Human Use Clinical Trial Regulations, 2004
   a. During the life span of the study GGHB requires the following information relating to this site
      i. Notification of any potential serious breaches.
      ii. Notification of any regulatory inspections.

It is your responsibility to ensure that all staff involved in the study at this site have the appropriate GCP training according to the GGHB GCP policy (www.nhsggc.org.uk/content/default.asp?page=s1411), evidence of such training to be filed in the site file.

NHS
Greater Glasgow and Clyde

2. **For all studies** the following information is required during their lifespan.
   a. Recruitment Numbers on a quarterly basis
   b. Any change of staff named on the original SSI form
   c. Any amendments – Substantial or Non Substantial
   d. Notification of Trial/study end including final recruitment figures
   e. Final Report & Copies of Publications/Abstracts

Please add this approval to your study file as this letter may be subject to audit and monitoring.

Your personal information will be held on a secure national web-based NHS database.

I wish you every success with this research study

Yours sincerely,

EPackard.

Dr Erica Packard
Research Co-ordinator

Appendix 2.5

Healthcare Quality, Governance and Standards Unit
Research, Development & Evaluation Office
58 Lister Street
Crosshouse Hospital
Kilmarnock
KA2 0BB

NHS Ayrshire & Arran

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Fax: (01563) 825806

Miss Mari O'Neill
Section of Psychological Medicine
1st Floor, Admin Building
Gartnavel Royal Hospital
1055 Great Western Road
Glasgow
G12 0XH

Date: 6 May 2011
Your Ref:
Our Ref: CAW/KLB/AMK R&D 2011AA016

Enquiries to: Karen Bell
Extension: 25850
Direct Line: 01563 825850
Email: Karen.bell@aaaht.scot.nhs.uk

Dear Miss O'Neill

Letter of access for research

As an existing NHS employee you do not require an additional honorary research contract with this NHS organisation. We are satisfied that the research activities that you will undertake in this NHS organisation are commensurate with the activities you undertake for your employer. Your employer is fully responsible for ensuring such checks as are necessary have been carried out. Your employer has confirmed in writing to this NHS organisation that the necessary pre-engagement check are in place in accordance with the role you plan to carry out in this organisation. This letter confirms your right of access to conduct research through NHS Ayrshire and Arran for the purpose and on the terms and conditions set out below. This right of access commences on 6 May 2011 and ends on 6 March 2012 unless terminated earlier in accordance with the clauses below.

You have a right of access to conduct such research as confirmed in writing in the letter of permission for research from this NHS organisation. Please note that you cannot start the research until the Principal Investigator for the research project has received a letter from us giving permission to conduct the project.

You are considered to be a legal visitor to NHS Ayrshire and Arran premises. You are not entitled to any form of payment or access to other benefits provided by this organisation to employees and this letter does not give rise to any other relationship between you and this NHS organisation, in particular that of an employee.

While undertaking research through NHS Ayrshire and Arran you will remain accountable to your employer **NHS Greater Glasgow & Clyde** but you are required to follow the reasonable instructions of your nominated manager **Dr Sharon Mulhern** in this NHS organisation or those given on her behalf in relation to the terms of this right of access.

Where any third party claim is made, whether or not legal proceedings are issued, arising out of or in connection with your right of access, you are required to co-operate fully with any investigation by this NHS organisation in connection with any such claim and to give all such assistance as may reasonably be required regarding the conduct of any legal proceedings.

You must act in accordance with NHS Ayrshire and Arran policies and procedures, which are available to you upon request, and the Research Governance Framework.

You are required to co-operate with NHS Ayrshire and Arran in discharging its duties under the Health and Safety at Work etc Act 1974 and other health and safety legislation and to take reasonable care for the health and safety of yourself and others while on NHS Ayrshire

and Arran premises. Although you are not a contract holder, you must observe the same standards of care and propriety in dealing with patients, staff, visitors, equipment and premises as is expected of a contract holder and you must act appropriately, responsibly and professionally at all times.

You are required to ensure that all information regarding patients or staff remains secure and *strictly confidential* at all times. You must ensure that you understand and comply with the requirements of the NHS Confidentiality Code of Practice (http://www.dh.gov.uk/assetRoot/04/06/92/54/04069254.pdf) and the Data Protection Act 1998. Furthermore you should be aware that under the Act, unauthorised disclosure of information is an offence and such disclosures may lead to prosecution.

NHS Ayrshire and Arran will not indemnify you against any liability incurred as a result of any breach of confidentiality or breach of the Data Protection Act 1998. Any breach of the Data Protection Act 1998 may result in legal action against you and/or your substantive employer.

You should ensure that, where you are issued with an identity or security card, a bleep number, email or library account, keys or protective clothing, these are returned upon termination of this arrangement. Please also ensure that while on the premises you wear your ID badge at all times, or are able to prove your identity if challenged. Please note that this NHS organisation accepts no responsibility for damage to or loss of personal property.

We may terminate your right to attend at any time either by giving seven days' written notice to you or immediately without any notice if you are in breach of any of the terms or conditions described in this letter or if you commit any act that we reasonably consider to amount to serious misconduct or to be disruptive and/or prejudicial to the interests and/or business of this NHS organisation or if you are convicted of any criminal offence. Where applicable, your substantive employer will initiate your Independent Safeguarding Authority (ISA) registration in-line with the phasing strategy adopted within the NHS (as from 26th July 2010 at the earliest). Once you are ISA-registered, your employer will continue to monitor your ISA registration status via the on-line ISA service. Should you cease to be ISA-registered, this letter of access is immediately terminated. Your substantive employer will immediately withdraw you from undertaking this or any other regulated activity and you MUST stop undertaking any regulated activity.

Your substantive employer is responsible for your conduct during this research project and may in the circumstances described above instigate disciplinary action against you.

If your circumstances change in relation to your health, criminal record, professional registration or ISA registration, or any other aspect that may impact on your suitability to conduct research, or your role in research changes, you must inform the NHS organisation that employs you through its normal procedures. You must also inform your nominated manager in this NHS organisation.

Yours sincerely

Professor Craig A White
Assistant Director (Healthcare Quality, Governance and Standards)

c.c. NHS Greater Glasgow & Clyde HR department

Appendix 2.6

Self-Compassion Scale - A

How I Typically Act Toward Myself in Difficult Times

Please read each statement carefully before answering. To the left of each item, indicate how often you behave in the stated manner.

Almost never				Almost always
1	2	3	4	5

_____ 1. I'm disapproving and judgmental about my own flaws and inadequacies.

_____ 2. When I'm feeling down I tend to obsess and fixate on everything that's wrong.

_____ 3. I try to be loving towards myself when I'm feeling emotional pain.

_____ 4. When I fail at something important to me I become consumed by feelings of inadequacy.

_____ 5. When times are really difficult, I tend to be tough on myself.

_____ 6. When something upsets me I try to keep my emotions in balance.

_____ 7. I'm intolerant and impatient towards those aspects of my personality I don't like.

_____ 8. When I'm feeling down, I tend to feel like most other people are probably happier than I am.

_____ 9. When I'm really struggling, I tend to feel like other people must be having an easier time of it.

_____ 10. I'm kind to myself when I'm experiencing suffering.

_____ 11. When something upsets me I get carried away with my feelings.

_____ 12. I can be a bit cold-hearted towards myself when I'm experiencing suffering.

_____ 13. I'm tolerant of my own flaws and inadequacies.

Self-Compassion Scale - B

How I Typically Act Toward Myself in Difficult Times

Please read each statement carefully before answering. To the left of each item, indicate how often you behave in the stated manner.

Almost never				Almost always
1	2	3	4	5

_____ 1. When things are going badly for me, I see the difficulties as part of life that everyone goes through.

_____ 2. When I think about my inadequacies, it tends to make me feel more separate and cut off from the rest of the world.

_____ 3. When I'm down and out, I remind myself that there are lots of other people in the world feeling like I am.

_____ 4. When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people.

_____ 5. When I'm going through a very hard time, I give myself the caring and tenderness I need.

_____ 6. When something painful happens I try to take a balanced view of the situation.

_____ 7. I try to see my failings as part of the human condition.

_____ 8. When I see aspects of myself that I don't like, I get down on myself.

_____ 9. When I fail at something important to me I try to keep things in perspective.

_____ 10. When I'm feeling down I try to approach my feelings with curiosity and openness.

_____ 11. When something painful happens I tend to blow the incident out of proportion.

_____ 12. When I fail at something that's important to me, I tend to feel alone in my failure.

_____ 13. I try to be understanding and patient towards those aspects of my personality I don't like.

Appendix 2.7

Reduction of the Empathy Quotient

The Empathy Quotient (Baron-Cohen & Wheelwright, 2004) contains 60 items; 40 empathy items and 20 control items. Using only the empathy items, Lawrence et al. (2004) removed the items that correlated with socially desirable responding and conducted a principal components analysis that reduced the scale to 28 items divided across three factors: cognitive empathy (11 items), emotional reactivity (11 items), and social skills (6 items). This model was adopted for the current study. Furthermore, to ensure that each factor could be equally split and balanced between the pre- and post-intervention measures, item 36 ("Other people tell me I am good at understanding how they are feeling and what they are thinking") was removed from the cognitive empathy scale as it had one of the lowest factor loadings (0.559) and also loaded on the emotional reactivity scale (0.315). Item 43 ("Friends usually talk to me about their problems as they say I am very understanding") was removed from the emotional reactivity scale as it had one of the lowest factor loadings (0.452) and also loaded on the cognitive empathy scale (0.442).

Appendix 2.8

The Empathy Quotient - A

Below is a list of statements. Please read each statement *carefully* and rate how strongly you agree or disagree with it by circling your answer. There are no right or wrong answers, or trick questions.

IN ORDER FOR THE SCALE TO BE VALID, YOU MUST ANSWER EVERY QUESTION.

1. I really enjoy caring for other people.	strongly agree	slightly agree	slightly disagree	strongly disagree
2. I find it hard to know what to do in a social situation.	strongly agree	slightly agree	slightly disagree	strongly disagree
3. I can pick up quickly if someone says one thing but means another.	strongly agree	slightly agree	slightly disagree	strongly disagree
4. It is hard for me to see why some things upset people so much.	strongly agree	slightly agree	slightly disagree	strongly disagree
5. I find it easy to put myself in somebody else's shoes.	strongly agree	slightly agree	slightly disagree	strongly disagree
6. Seeing people cry doesn't really upset me.	strongly agree	slightly agree	slightly disagree	strongly disagree
7. I don't tend to find social situations confusing.	strongly agree	slightly agree	slightly disagree	strongly disagree
8. I can sense if I am intruding, even if the other person doesn't tell me.	strongly agree	slightly agree	slightly disagree	strongly disagree
9. I usually stay emotionally detached when watching a film.	strongly agree	slightly agree	slightly disagree	strongly disagree
10. I can tune into how someone else feels rapidly and intuitively.	strongly agree	slightly agree	slightly disagree	strongly disagree
11. I can easily work out what another person might want to talk about.	strongly agree	slightly agree	slightly disagree	strongly disagree
12. I don't consciously work out the rules of social situations.	strongly agree	slightly agree	slightly disagree	strongly disagree
13. I am good at predicting what someone will do.	strongly agree	slightly agree	slightly disagree	strongly disagree

Thank you for filling this questionnaire in.

The Empathy Quotient - B

Below is a list of statements. Please read each statement *carefully* and rate how strongly you agree or disagree with it by circling your answer. There are no right or wrong answers, or trick questions.

IN ORDER FOR THE SCALE TO BE VALID, YOU MUST ANSWER EVERY QUESTION.

1. I can easily tell if someone else wants to enter a conversation.	strongly agree	slightly agree	slightly disagree	strongly disagree
2. I find it difficult to explain to others things that I understand easily, when they don't understand it first time.	strongly agree	slightly agree	slightly disagree	strongly disagree
3. Friendships and relationships are just too difficult, so I tend not to bother with them.	strongly agree	slightly agree	slightly disagree	strongly disagree
4. I often find it difficult to judge if something is rude or polite.	strongly agree	slightly agree	slightly disagree	strongly disagree
5. I am good at predicting how someone will feel.	strongly agree	slightly agree	slightly disagree	strongly disagree
6. I am quick to spot when someone in a group is feeling awkward or uncomfortable.	strongly agree	slightly agree	slightly disagree	strongly disagree
7. If I say something that someone else is offended by, I think that that's their problem, not mine.	strongly agree	slightly agree	slightly disagree	strongly disagree
8. I can't always see why someone should have felt offended by a remark.	strongly agree	slightly agree	slightly disagree	strongly disagree
9. I can easily tell if someone else is interested or bored with what I am saying.	strongly agree	slightly agree	slightly disagree	strongly disagree
10. I get upset if I see people suffering on news programmes.	strongly agree	slightly agree	slightly disagree	strongly disagree
11. Other people often say that I am insensitive, though I don't always see why.	strongly agree	slightly agree	slightly disagree	strongly disagree
12. I can tell if someone is masking their true emotion.	strongly agree	slightly agree	slightly disagree	strongly disagree
13. I tend to get emotionally involved with a friend's problems.	strongly agree	slightly agree	slightly disagree	strongly disagree

Thank you for filling this questionnaire in.

Appendix 2.9

Relaxation Likert Scale

1. Overall, how relaxed do you feel?

1	2	3	4	5	6	7
Not relaxed at all						Very relaxed

2. Take a moment to focus on your body. How tense do you feel physically?

1	2	3	4	5	6	7
Not tense at all						Very tense

3. Take a moment to focus on your thoughts. How calm do you feel?

1	2	3	4	5	6	7
Not calm at all						Very calm

Note: - Item 2 will be reverse scored.

Appendix 2.10

Compassionate Imagery treatment session script

Thank you very much for agreeing to take part in my research. The point of this research is to look at how people experience different types of imagery and how it may affect how they feel and what they do. For example, if you were feeling hungry and you saw a meal it could stimulate your saliva and your stomach acids, but equally if you thought about a meal your image in your mind could also stimulate your stomach acids. Our own thoughts and images can stimulate our feelings.

Today's session is in three stages. First I'm going to teach you how to engage in a form of breathing which will allow you to centre yourself and prepare your body for imagery. This breathing can help you to feel calm. After that we are going to explore what imagery is and isn't. Then I will guide you through an imagery exercise.

We will begin then by working on our breathing.

Soothing Breathing Rhythm

Before engaging in the imagery work it is helpful to practice a style of breathing that can help with the imagery. We're going to focus on slightly slowing the breath with a particular focus on the out breath. The reason for this is because our breath can have an effect on how we feel in our body. It can help us become more at peace with ourselves.

Okay, take up a comfortable seating position with your feet flat on the floor, about a shoulders width apart and your back straight and head in line. When you do these exercises you might find that there is a tendency for your head to slump forward. Notice this and return it gently to the upright position. Let your hands rest comfortably in your lap.

Now that you are sitting comfortably, close your eyes, or look down at the floor if you prefer. Allow yourself to have a gentle facial expression that may be a slight smile.

Now just gently focus on your breathing. As you breathe try to allow the air to come in through your nose and then down into your diaphragm (that's just at the bottom of your ribcage in the upside down 'V'). Feel your diaphragm, the area underneath your ribs, move as you breathe in and out. Just notice your breathing and play an experiment with your breathing. Breathe a little faster or a little slower until you find a breathing pattern that, for you, seems to be your own soothing, comforting

rhythm. It is like you are checking in, linking up, with the rhythm within your body that is soothing and calming to you.

For the soothing breathing rhythm you will be breathing slightly slower and deeper than normal. The in-breath is about 3 seconds … hold … and then take 3 seconds for the out-breath. Ensure that the breaths in and out are smooth and even.

Now spend a little while – for as long as you wish - just focusing on your breathing, just noticing the breath coming in through your nose and down into the diaphragm, your diaphragm lifting and then the air moving out, through your nose again. Sometimes it's useful to focus on the point just inside your nose where the air enters. Just focus on that for a while…….

As you work with this exercise of soothing rhythm breathing notice how you have a sense of slowing down. Feeling your way into that sense of slowing down, experiencing yourself becoming slightly heavier in the chair for example.

Now we can just 'ground ourselves for a moment'. So turn your attention to your body. Sensing the weight of your body resting on the chair and the floor underneath you…. Allowing yourself to feel held and supported…..coming to rest…in the present moment….

Remember that it is perfectly ok for your mind to wander. Simply notice it happening with curiosity about where your mind has gone and then gently guide your attention back to an awareness of your body as best as you can. Now just sense the flow of air coming in and out of your nostrils….just gently observing….no need to change anything…..just allowing things to be as they are.

When you feel ready, slowly open your eyes and bring yourself back to the present moment.
Sometimes it helps if you just have a gentle stretch and a deep breath.

Imagery work: Preparation

Wandering mind

Whenever we try to do certain tasks using our mind a very common difficulty is that our mind wanders all over the place, particularly if we're agitated or restless. Indeed do not be surprised to find that your mind wanders a lot and you might not be able to keep it on task for more than a couple of seconds. This is perfectly normal.

The most important thing is simply to notice and return your attention to what you are focusing on. If you find yourself feeling frustrated by how your mind wanders, simply notice this and return to the task. Keep in mind that the kinder, gentler and more accepting you are of your wandering mind, the less you try to force it to pay attention, and the more open you are, the easier you may find this exercise.

Also key here is that your intention is simply to try - that's the important thing.

No clear pictures

People often don't have clear pictures in their mind when they do imagery. They then think they are not doing imagery right or can't do imagery. This is because they often misunderstand imagery. Supposing I ask you 'what is a car?' -how would you answer that? What popped into your mind? The image might not be clear in your mind. If I asked you what summer holiday would you like? You would have some kind of fleeting imagery based on what you like –e.g., hot or cold countries, doing activities or just sitting by a pool. This is imagery. It is very fleeting and impressionistic; a touch of colour here, or a sense of something there. Do not try to create Polaroid pictures in your mind, impressions are fine and it's more important that we focus on the feelings we are trying to create with our images.

Keep these things in mind when we get to the practice. Now, our first exercise is going to be creating a compassionate sense of self.

Imagining and becoming the compassionate self

Acting: A very useful way to think about and approach this practice is using *acting* techniques. If you were an actor learning to act, you would pay attention to key elements of a character. This might be a character that is angry, depressed, anxious, happy, joyful, or, of course, compassionate. As a keen actor, what you would try and do would *be to create those experiences within yourself*, try *to be* or become that character – live it from the inside – for a short while. To do this you might pay attention to the way this character thinks and sees the world, the tone of voice of the character, the postures and the general bearing of the character, the kinds of things they say and the way they say them.

The character we are going to become here is a compassionate one; this is the part of us we want to feed, nurture and develop. So to do this you are going to imagine that *you are* a compassionate person and imagine having certain qualities and characteristics. Keep in mind that it doesn't matter if you

think you are in reality a compassionate person or not -the key is to spend time imagining that you are and imagining what that's like.

Begin by focusing on your soothing rhythm breathing.

When you feel that your body has slowed down (even slightly) and you are ready for your practice, imagine that *you are* a very deeply compassionate person. Think of all the qualities that you would ideally have as that compassionate person. First focus on your desires to become a compassionate person and to be able to think, act and feel compassionately.

Relax your facial muscles by first relaxing your forehead, cheeks and allow your jaw to drop slightly. Then just begin to let yourself smile until it feels comfortable and creates a sense of gentleness, kindness and compassion.

We are now going to imagine having four main qualities that help us to focus in on compassion and kindness. For example, compassion has wisdom as opposed to ignorance; it has strength and authority in contrast to anxiety and uncertainty, and it has a full commitment to take responsibility and be helpful. So let's focus on these for a moment: wisdom, strength and authority, responsibility, and being helpful.

Another way to think of this is that you are going to imagine *you at your very best*, you as you would ideally like to be -even if at times we know we can't always reach our ideal we can still imagine how we'd ideally like to be e.g. as a strong, kind compassionate self.

As you sit there with your soothing rhythm breathing, just imagine qualities of warmth – a gentle friendliness. Imagine being warm and kind. Imagine yourself speaking to someone and hear the tone of your voice; really notice your tones and textures. Imagine reaching out to someone *with warmth.* Notice the feelings of wanting people to feel safe and be with you.

(40 secs)

Now imagine being wise and having wisdom – a wisdom that comes from your understanding about the nature of our lives, of our minds and bodies. So your kindness is very insightful and understanding.

(40 secs)

Now focus on imagining having strength, maturity, authority. Explore your body posture (sitting confidently and assertively) your facial expressions – remember you are *imagining* yourself as a

person who understands your own difficulties and those of others, in a non judgmental way, and has confidence to be sensitive, with an ability to tolerate difficulties.

(40 secs)

Now imagine that you have a great desire of wanting to do the best you can to be supportive and helpful. Hold on to your compassionate facial expression and warmth and focus on this experience of committing yourself to a compassionate path of self development.

(40 secs)

Directing compassion: Now we are going to direct our compassion. Reflect on the feelings that come up for you when you think of yourself as a kind compassionate person. Note any resistance to that and gently just note it and re-focus. Remember, *it doesn't matter if you feel you have these qualities or not*, just *imagine* that you have them. See yourself having them, and work through them steadily, playfully and slowly. Remember that you may just get glimmers of things because your mind wanders. Gently allow yourself to re-focus.

Now bring someone to mind that you care about. Imagine wishing them to be happy, and to flourish. As you breathe out imagine them in front of you and say their name followed by "may you be happy" - and notice the feeling that comes up for you when you really wish this for them. Notice your slight smile on your face of wanting happiness for them. Then focus on "may you flourish" and see them in your mind as flourishing. Notice your own feeling from wishing this for them.

(1 minute)

Take a breath and imagine yourself as a compassionate person. Imagine yourself as you ideally would like to be, *you at your very best*. Just imagine yourself as this wise, kind, strong, compassionate person. Take your calm open posture and soothing breathing rhythm and just imagine yourself as this person. Imagine being outside and all the people around you wanting you to be happy.

Compassionate Ideal

Now we are going to help you *build* a compassionate image. The reason for doing this is that we stimulate systems in our brain by imagining relationships. For example, if we imagine ourselves being angry with somebody it stimulates our anger systems. So when we imagine *types of relationship* we are stimulating those areas of our brain that are used in those relationships.

So we're going to create your ideal of a compassionate being for you. Then when you start thinking of relating to it you will be stimulating those brain systems that link to compassion. Whatever image comes to mind note that it is *your* creation and therefore your own personal ideal - what you would really like from feeling cared about. However, in this practice it is important that you try to give your image certain qualities. These are complete and perfect compassionate qualities that are there for you to practice creating and bringing to mind.

To start with then sit comfortably and engage with your soothing rhythm breathing until you feel comfortable with it and ready for imagery. Remind yourself that your mind is likely to wander but just kindly bring it back when you notice that it does. Remind yourself that your imagery may be quite fleeting and it's not about how clear images are but how you orientate your mind.

You might want to imagine a pleasant place where you would like to meet your compassionate figure. Now imagine that figure coming towards you or you towards them. Then imagine them being with you, either in front of you standing or sitting next to you.

- Take a few moments to imagine what they would look like for you? Would you want your ideal compassionate image to feel/look/seem old or young; to be male or female (or non-human looking, e.g. an animal, sea or light)?

(20 secs)

- Now imagine how your compassionate image sounds when they communicate with you. What is their compassionate voice tone for you like?

(20 secs)

Now take a few moments to think about how the image looks, sounds, smells and feels.

(20 secs)

Imagining qualities of compassion

Warmth: Focus on the sense of warmth, kindness and safeness you feel with this being. Allow yourself to have a compassionate and even joyful facial expression of enjoying being with this being.

(40 secs)

Strength: focus on and create a sense of their maturity authority and confidence**.** They are not overwhelmed by your pain or distress, but remain present, enduring it with you. You feel it as a sense of authority, strength and maturity.

(40sec)

Wisdom: as you imagine this being, have a sense of their great wisdom that comes through their kindness and their sense of authority. Sense that they truly understand the struggles we go through in life. We all 'just find ourselves here', doing the best we can.

(40 secs)

Focus on them having a very deep commitment to you. No matter what, they are fully and completely accepting and committed to supporting and helping you. If you notice thoughts of not deserving -just notice those thoughts and bring yourself back to remembering this is your personal ideal and as your personal ideal they will accept you and try to help you.

(40 secs)

Now keeping your compassionate facial expression imagine being with this being and sensing these qualities for you -flowing fully and freely and openly to you in the most compassionate way.

(40 sec)

Now, in your own time open your eyes letting the image and the emotions you have begin to fade away.

Appendix 2.11

Relaxation treatment session script

Thank you very much for agreeing to take part in my research. The point of this research is to look at how people experience different types of imagery and how it may affect how they feel and what they do. For example, if you were feeling hungry and you saw a meal it could stimulate your saliva and your stomach acids, but equally if you thought about a meal your image in your mind could also stimulate your stomach acids. Our own thoughts and images can stimulate our feelings.

Today's session is in three stages. First I'm going to teach you how to engage in a form of breathing which will allow you to centre yourself and prepare your body for imagery. This breathing can help you to feel calm. Next we are going to explore with you what imagery is and isn't. Then I will guide you through an imagery exercise.

We will begin then by working on our breathing.

Soothing Breathing Rhythm

Before engaging in the imagery work it is helpful to practice a style of breathing that can help with the imagery. We're going to focus on slightly slowing the breath with a particular focus on the out breath. The reason for this is because our breath can have an effect on how we feel in our body. It can help us become more at peace with ourselves.

Okay, take up a comfortable seating position with your feet flat on the floor, about a shoulders width apart and your back straight and head in line. When you do these exercises you might find that there is a tendency for your head to slump forward. Notice this and return it gently to the upright position. Let your hands rest comfortably in your lap.

Now that you are sitting comfortably, close your eyes, or look down at the floor if you prefer. Allow yourself to have a gentle facial expression that may be a slight smile.

Now just gently focus on your breathing. As you breathe try to allow the air to come in through your nose and then down into your diaphragm (that's just at the bottom of your ribcage in the upside down 'V'). Feel your diaphragm, the area underneath your ribs, move as you breathe in and out. Just notice your breathing and play an experiment with your breathing. Breathe a little faster or a little slower until you find a breathing pattern that, for you, seems to be your own soothing, comforting rhythm. It is like you are checking in, linking up, with the rhythm within your body that is soothing and calming to you.

For the soothing breathing rhythm you will be breathing slightly slower and deeper than normal. The in-breath is about 3 seconds … hold … and then take 3 seconds for the out-breath. Ensure that the breaths in and out are smooth and even.

Now spend a little while – for as long as you wish - just focusing on your breathing, just noticing the breath coming in through your nose and down into the diaphragm, your diaphragm lifting and then the air moving out, through your nose again. Sometimes it's useful to focus on the point just inside your nose where the air enters. Just focus on that for a while…….

As you work with this exercise of soothing rhythm breathing notice how you have a sense of slowing down. Feeling your way into that sense of slowing down, experiencing yourself becoming slightly heavier in the chair for example.

Now we can just 'ground ourselves for a moment'. So turn your attention to your body. Sensing the weight of your body resting on the chair and the floor underneath you…. Allowing yourself to feel held and supported…..coming to rest…in the present moment….

Remember that it is perfectly ok for your mind to wander. Simply notice it happening with curiosity about where your mind has gone and then gently guide your attention back to an awareness of your body as best as you can. Now just sense the flow of air coming in and out of your nostrils….just gently observing….no need to change anything…..just allowing things to be as they are.

When you feel ready, slowly open your eyes and bring yourself back to the present moment.
Sometimes it helps if you just have a gentle stretch and a deep breath.

Imagery work: Preparation

Wandering mind

Whenever we try to do certain tasks using our mind a very common difficulty is that our mind wanders all over the place, particularly if we're agitated or restless. Indeed do not be surprised to find that your mind wanders a lot and you might not be able to keep it on task for more than a couple of seconds. This is perfectly normal.

The most important thing is simply to notice and return your attention to what you are focusing on. If you find yourself feeling frustrated by how your mind wanders, simply notice this and return to the

task. Keep in mind that the more relaxed and calm you feel, the less you try to force it to pay attention, and the more open you are, the easier you may find this exercise.

Also key here is that your intention is simply to try - that's the important thing.

No clear pictures

People often don't have clear pictures in their mind when they do imagery. They then think they are not doing imagery right or can't do imagery. This is because they often misunderstand imagery. Supposing I ask you 'what is a car?' -how would you answer that? What popped into your mind? The image might not be clear in your mind. If I asked you what summer holiday would you like? You would have some kind of fleeting imagery based on what you like –e.g., hot or cold countries, doing activities or just sitting by a pool. This is imagery. It is very fleeting and impressionistic; a touch of colour here, or a sense of something there. Do not try to create Polaroid pictures in your mind, impressions are fine and it's more important that we focus on the feelings we are trying to create with our images.

Keep these things in mind when we get to the practice. Now, our first exercise is going to be creating a calm sense of self.

Imagining and becoming the calm self

Acting: A very useful way to think about and approach this practice is using *acting* techniques. If you were an actor learning to act, you would pay attention to key elements of a character. This might be a character that is angry, depressed, anxious, happy, joyful, or, of course, calm. As a keen actor, what you would try and do would *be to create those experiences within yourself*, try *to be* or become that character – live it from the inside – for a short while. To do this you might pay attention to the way this character thinks and sees the world, the tone of voice of the character, the postures and the general bearing of the character, the kinds of things they say and the way they say them.

The character we are going to become here is a calm and relaxed one; this is the part of us we want to feed, nurture and develop. So to do this you are going to imagine that *you are* a calm and relaxed person and imagine having certain qualities and characteristics. Keep in mind that it doesn't matter if you think you are in reality a calm person or not -the key is to spend time imagining that you are and imagining what that's like.

Begin by focusing on your soothing rhythm breathing.

When you feel that your body has slowed down (even slightly) and you are ready for your practice, imagine that *you are* a very deeply calm and relaxed person. Think of all the qualities that you would ideally have as that calm and relaxed person. First focus on your desires to become a calm person and to be able to think, act and feel in a calm way.

Relax your facial muscles by first relaxing your forehead, cheeks and allow your jaw to drop slightly. Then just begin to let yourself smile until it feels comfortable and creates a sense of relaxation.

We are now going to imagine the qualities that help us to focus in on relaxation. For example, relaxation removes tension, it is calm as opposed to stressed, it is still in contrast to being busy and hectic, and it has tranquillity as opposed to chaos. So let's focus on these for a moment: relaxation, calm, still and tranquillity.

Another way to think of this is that you are going to imagine yourself in your most relaxed state of mind, in a place where you feel calm and still. We will begin by releasing the tension in the muscles in your body.

Instructions for Relaxation Session: Sit back in your chair with your feet flat on the ground and your hands resting on your thighs. Take a few moments to focus on your soothing rhythm breathing.

Begin by rocking your feet forward up onto your tiptoes. Hold for the count of 5 and feel the tension down the front of your legs. Then slowly release and relax. Rock your feet backwards onto your heels with your toes pointing to the sky. Hold for the count of 5 and feel the tension in the back of your legs. Then slowly release and fully relax. We will repeat this 3 times.

Now squeeze your knees together tightly. Feel the tension along the muscles at the top of your legs. Hold for the count of 5 then slowly release and relax. (Repeat 3 times).

Pull your tummy muscles in tightly and feel the tension across your stomach. Hold for the count of 5 then slowly release and relax. (Repeat 3 times).

Stretch your arms out in front of you with your hands squeezed tightly into fists. Feel the tension along the length of your arms. Hold for the count of 5 then slowly release and relax. (Repeat 3 times).

Lift your shoulders up to your ears and feel the tension in your shoulders and your back. Hold for the count of 5 then slowly release and relax. (Repeat 3 times).

Close your eyes tightly and tighten the muscles in your face. Feel the tension in your face. Hold for the count of 5 then slowly release and relax. (Repeat 3 times).

Focus on breathing slowly and calmly. Feel the breath flowing smoothly in and out of your body. Be aware of the chair supporting you under your legs and behind your back, and of the ground supporting you from underneath your feet.

As you focus on breathing slowly and the feelings of relaxation flowing through your body begin to imagine a special place where you feel calm and relaxed.

Imagine what this place needs to be like in order for you to feel calm and relaxed. Start with the physical layout of the place you are imagining..... where is this peaceful place? You might picture somewhere outdoors.... or indoors..... it may be a small place or large one..... create an image of this calm and relaxing place.

(20 secs)

Now picture some more details about your peaceful place. Who is in this place? Are you alone? Or perhaps you are with someone else? Are there other people present? Animals? Birds? Imagine who is in your calm and relaxing place, whether it is you only, or if you have company.

(20 secs)

Imagine even more detail about your surroundings. Focus now on the relaxing sounds around you in your peaceful place.

Now imagine any tastes and smells your place has to offer.

Imagine the sensations of touch... including the temperature, any breeze that may be present, the surface you are on.... imagine the details of this calming place in your mind.

Focus now on the sights of your place - colours, shapes.... objects.... plants..... water..... all of the beautiful things that make your place enjoyable.

Imagine yourself in this relaxing scene. What would you be doing in this calming place? Perhaps you are just sitting, enjoying this place, relaxing. Maybe you imagine walking around.... or doing any other variety of activities.

Picture yourself in this peaceful place. Imagine a feeling of calm..... of peace..... a place where you have no worries, cares, or concerns.... a place where you can simply rejuvenate, relax, and enjoy just being.

(40 secs)

Enjoy being in your peaceful place for a few moments. Memorize the sights, sounds, and sensations around you.

Focus on the qualities of relaxation, being calm, still and tranquil. The tension is flowing out of your body and you are feeling fully relaxed. Your breathing is calm and soothing. You mind feels still and quiet. You are surrounded by a feeling of tranquillity and calm relaxation. Enjoy this feeling for a few moments more

(1 minute)

Now slowly begin to turn your attention back to the present. Notice your surroundings as your body and mind return to their usual level of alertness and wakefulness.

Keep with you the feeling of calm from your peaceful place as you return to the present moment.

Appendix 2.12

People's feelings after a session of using mental imagery

Contact details: Mari O'Neill
University of Glasgow,
Section of Psychological Medicine,
1055 Great Western Road,
Glasgow, G12 0XH
Email: m.o'neill.1@research.gla.ac.uk

Information Sheet

You are being invited to take part in a research study. Before you decide whether or not you wish to take part in this study, it is important for you to understand why the research is being done and what it will involve. Please take time to read this information carefully and discuss it with others if you wish. Please ask me if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part. You do not have to make an immediate decision.

Who is conducting the research?
This study is being carried out by Mari O'Neill and is being supervised by Professor Tom McMillan from the University of Glasgow.

What is the purpose of the study?
The purpose of this study is to examine how a session of mental imagery influences how people feel after head injury. This study will also be submitted as part of the main researcher's (Mari O'Neill) portfolio for examination by the University of Glasgow as part of the Doctorate in Clinical Psychology.

Why have I been invited?
You have been invited to take part as you experienced a head injury more than 3 months ago and experienced post traumatic amnesia of one day or more.

Do I have to take part?
It is up to you to decide. We will describe the study and go through this information sheet, which we will then give to you. You will be asked to sign a consent form to show you have agreed to take part. You are free to withdraw at any time, without giving reason. This would not affect the standard of care you receive or your future treatment.

What does taking part involve?
Taking part involves attending for one or two sessions to complete some questionnaires and/or treatment. If you are invited to take part in the treatment session this will involve up to 1 and a half hours to complete a few additional questionnaires and take part in a treatment session. Questionnaires will be completed before and after the treatment session. The treatment session involves practicing breathing techniques and mental imagery. 'Mental imagery' involves thinking of certain images in your mind such as imagining a colour, a special place or a feeling, such as relaxation. Testing will take place at a centre that you are familiar with and can access.

What happens to the information?
Your identity and personal information will be completely confidential and known only to the researcher. The information obtained will remain confidential and stored within a locked filing cabinet. Data collected will be anonymised and unique codes will be used as identifiers. The data are held in accordance with the Data Protection Act, which means that we keep it safely and cannot reveal it to other people without your permission.

Will you contact my GP?
With your permission, we will send your GP a short letter to let them know that you are taking part in the study. If you would like to see an example of the letter, please just ask the researcher.

What are the possible effects on you?
The treatment session may generate a number of emotional reactions for you. These emotions may be positive or negative. Should you experience a negative emotional reaction you will be offered the opportunity to discuss this with the researcher or a member of your clinical support staff.

What are the possible benefits of taking part?
By taking part in this research you will be providing valuable information on the development of a psychological therapy that could potentially improve empathy in people who have experienced a head injury.

Who has reviewed the study?
This study has been reviewed by the West of Scotland Research Ethics Committee.

If you have any further questions?
We will give you a copy of the information sheet and signed consent form to keep. If you would like more information about the study and wish to speak to someone not closely linked to the study, please contact **Dr Sue Turnbull, Research Tutor, University of Glasgow, Section of Psychological Medicine, email: s.turnbull@clinmed.gla.ac.uk, Tel no: 0141 211 3927.**

If you have a complaint about any aspect of the study?
If you are unhappy about any aspect of the study and wish to make a complaint, please contact the researcher in the first instance but the normal NHS complaint mechanism is also available to you.

Contact Details:

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Trainee Clinical Psychologist
University of Glasgow
Section of Psychological Medicine
1055 Great Western Road
Glasgow, G12 0XH
Email: m.o'neill.1@research.gla.ac.uk

Professor Tom McMillan
University of Glasgow
Section of Psychological Medicine
1055 Great Western Road
Glasgow, G12 0XH
Email: Thomas.McMillan@glasgow.ac.uk
Tel: 0141 211 0694

Thank you for taking the time to read this information sheet.

Appendix 2.13

Consent Form

People's feelings after a session of using mental imagery

Contact details: Mari O'Neill
University of Glasgow,
Section of Psychological Medicine,
1055 Great Western Road,
Glasgow, G12 0XH
Email: m.o'neill.1@research.gla.ac.uk

Please initial the BOX

I confirm that I have read and understand the information sheet dated 16/03/2011 for the above study.	☐
I confirm that the researcher has answered any queries to my satisfaction.	☐
I understand that my participation is voluntary and that I am free to withdraw from the project at any time, without having to give a reason and without any consequences.	☐
I understand that I can withdraw my data from the research database at any time.	☐
I understand that any information recorded in the investigation will remain confidential and no information that identifies me will be made publicly available.	☐
I give permission for my G.P. to be informed that I am taking part in the study.	☐
I consent to being a participant in the project.	☐

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Name of Participant	Date	Signature
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Name of Witness	Date	Signature

1 copy to the patient, 1 copy to the researcher, 1 original for the patient's notes